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assembly & fastener ENGINEERING

MARCH • 1960

Fastening Techniques for Plymouth's Unibody

Also in this issue: **Soldering Stainless Steel**
How Air Logistics Selects Fasteners
Structural Adhesives for Joining Metals

and here's how Pheoll solved it

A recent development by Pheoll has made this fisherman's regular job a lot easier. The job . . . that of electrician.

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This is typical of Pheoll experience . . . the application of creative engineering to basic, everyday fastener problems . . . that can be helpful to your company.

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assembly & fastener ENGINEERING

March, 1960 Volume 3, Number 3

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BPA

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Letters to the Editor

Fastening Reinforced Plastics

My company is sponsoring a technical book (one of a continuing series on various aspects of reinforced plastics) on "Machining and Mechanical Fasteners for Fiberglas Reinforced Plastics."

Mr. T. B. Blevins, of the Materials Section of Army Ordnance is chief author, with cooperation from this writer.

While we have called on many fastener manufacturers, we have found a dearth of information on the application of specialty fasteners with respect to various applications for reinforced plastics.

We would like to appeal to your readers and the various suppliers of fasteners for any test information they may have on pull-out strength and joint strengths, plus interesting applications where special problems have been solved. Both text and photos will be welcome, and credit will be given when used.

If any of your readers have such information, I would appreciate having them contact me.

A. Winsor Brown
Development Engineer
Owens-Corning Fiberglas Corp.
Product Development Laboratory
Ashton, Rhode Island

Work Load of 100 Pounds

This is to advise that on page 55 of your December issue, we would like you to note that our index table will make up to 75 indexes per minute and will handle a maximum work load of 100 pounds (not 1000 as incorrectly reported).

Richard T. Dailey
President
Air-Hydraulics, Inc.
Jackson, Michigan

Torque Requirements

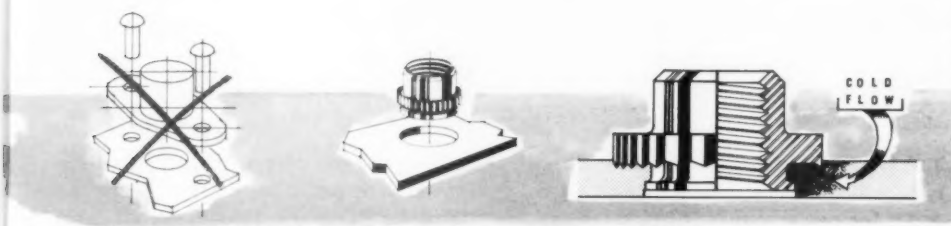
I am assembling data for the composition of company standards on torque requirements of all types of screws and fastening hardware, especially directed to air-drive applications. Whatever information you have on this subject would be greatly appreciated; or, if unavailable, perhaps you could direct me to a source of such data.

Shelby Drucker
Industrial Engineer
Librascope, Incorporated
Glendale, California

THE ROSÁN PRESS-LOCK PRINCIPLE

RELIABLE THROUGH THICK AND THIN

Rosán Press Nuts are now packaged and available in INTRODUCTORY KITS for your design evaluation and test. A trial of the Rosán Press Nuts can effect substantial savings in your prototype and production work.



TYPICAL PLATE NUT INSTALLATION · ROSAN PRESS NUT · INSTALLED PRESS NUT

FASTEN SECURELY WITHOUT RIVETS OR TAPPING

The metal displaced by the knurled flange flows evenly and smoothly around the recessed groove. This cold flow (illustrated left) securely locks the Press Nut and provides high pull out resistance. The embedded flange provides high torque resistance.

ONE HOLE – ONE PART – ONE TOOL

The Rosán Press-Lock Principle is the latest development in fasteners for thick and thin materials. Press Nuts have been approved by the military and standardized by many national defense manufacturing companies.

For price and sizes of the new Press Nut Introductory Kits, write Dept. M-48. Engineering data on other Rosán Press-Lock fasteners (illustrated below) will be provided upon request. *Not available in kits.

PRESS NUT · *FLOATING PRESS NUT · *DOME PRESS NUT · *ROLLED SKIRT PRESS NUT · *PRESS BOLT

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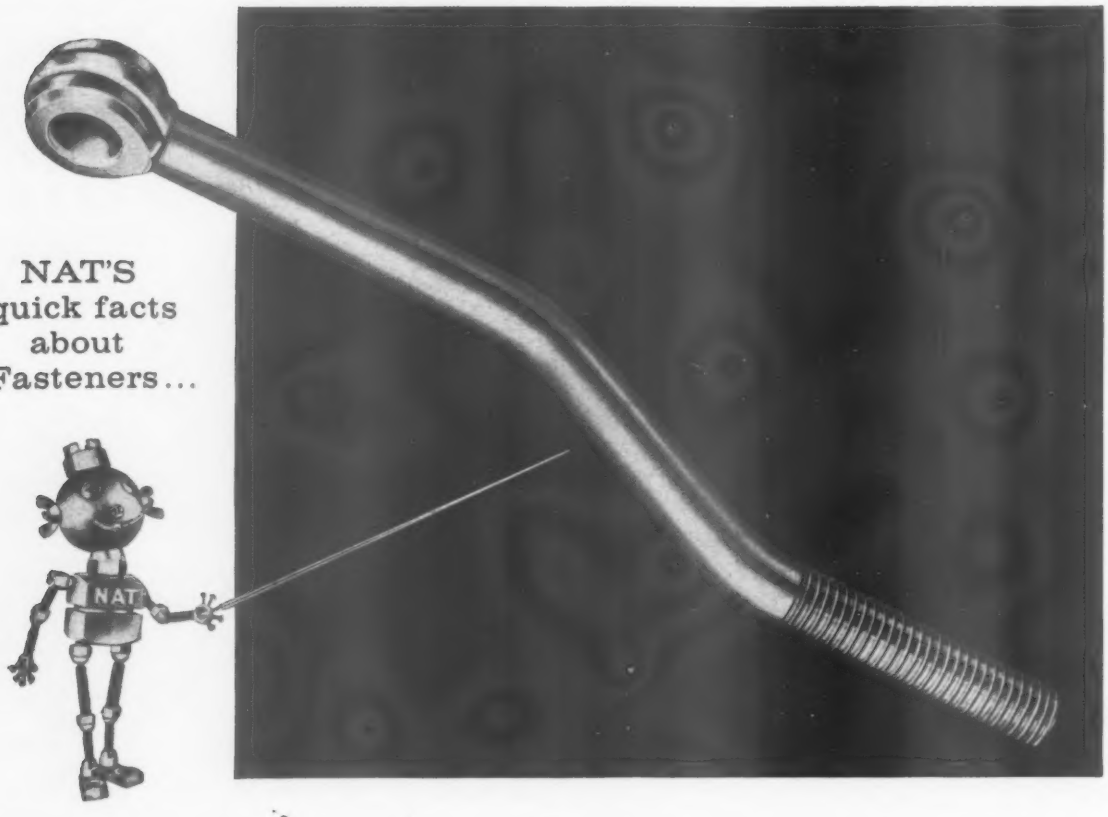

Shining example...of big things in **specials** by National

This is a large offset eyebolt, shown here big as life. We designed and made it to order for one of our customers.

To begin with, it shows that we can and do make some sizable things in the way of cold headed Special Products.

But there's more here than seems to meet the eye.

When our customer brought us this eyebolt, he had been having it made as a forged eye welded to a machined bolt, with a cut thread.

We gave it some thought, then made it... with a difference. We cold formed it in one piece, and rolled the thread... turning out a stronger, more practical, and more efficient part, and lopping off costs all along the line.

And there's the real point... what we really mean when we mention doing BIG things in Specials, at National... better parts, large or small, at lower cost, by cold heading and designing for profit.

We do it right along, and we can very likely do it for you, too. Want to find out? Just drop a note to Special Products Service, at our address*. And if you just happen to have a Special problem, tell us all about it—and let us help.

*It will bring you this illustrated booklet "Bring your Special Problems to National", 16 pages about Specials as National sees them.

National PRODUCTS

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California Division, The National Screw & Mfg. Company • 3423 South Garfield Avenue, Los Angeles 22, California

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Try it in your shop and see how it writes circles around other methods! Send us your purchase order. Money refunded if, after a five-day trial, the tool is unsatisfactory. *The Rotor Tool Company, 26306 Lakeland Boulevard, Cleveland 32, Ohio.*

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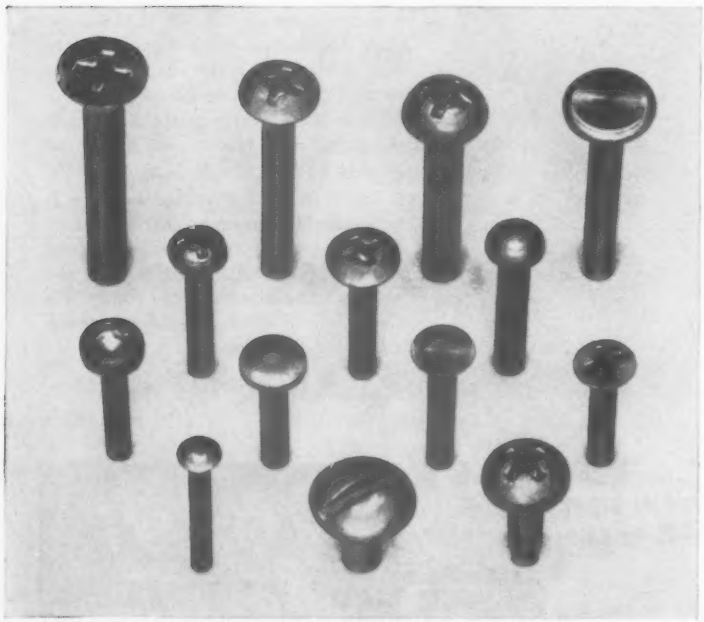
COLD-HEAD THESE AT 450 PER MINUTE

National High Speed Headers are capable of producing a wide variety of odd shapes like the above, as well as conventional fastener blanks.



Screw blanks stand perfectly erect. Such accuracy of product begins with a square, clean cutoff blank.

If you operate Headers, or use metal parts in quantity, here is good news.

The National High Speed Cold Header is the exciting new breakthrough in producing metal parts!

Witness production runs of difficult-to-make parts. Observe the many advanced features in machines and tooling, as well as new cold-heading techniques now proved in everyday production.

Start now toward the benefits of sustained production at the highest *safe* speeds ever achieved. Be among the forward-looking header plants installing Nationals these days.

We offer you (1) A precision, handcrafted machine, (2) Sound engineering assistance, and (3) Our experience in helping you flow metal.

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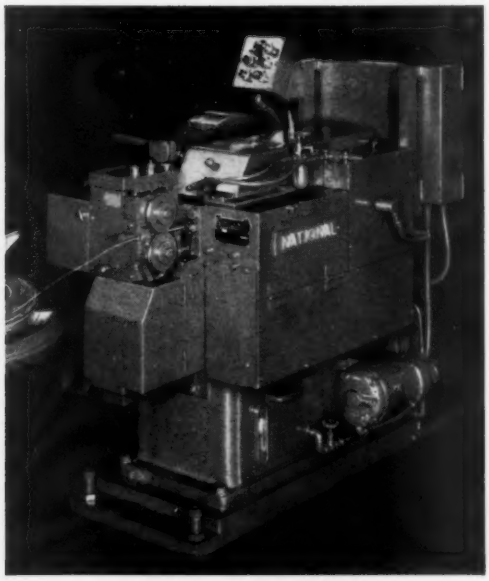
ON NATIONAL 1/8" HIGH-SPEED HEADERS!



1/8" High Speed Double Stroke Solid Die Cold Header: 450 accurate pieces per minute

3/16" High Speed Double-Stroke Solid-Die Cold Header: 350 accurate pieces per minute

Not just speed alone, but speed *plus...*

- Accuracy of Product
- Rigidity—Good Tool Life
- Holds Adjustment Well
- Lower Maintenance
- Fewer and Simple Adjustments
- Can Handle Many Jobs

We welcome you to Tiffin for actual demonstrations and a thorough study of your cold heading requirements.

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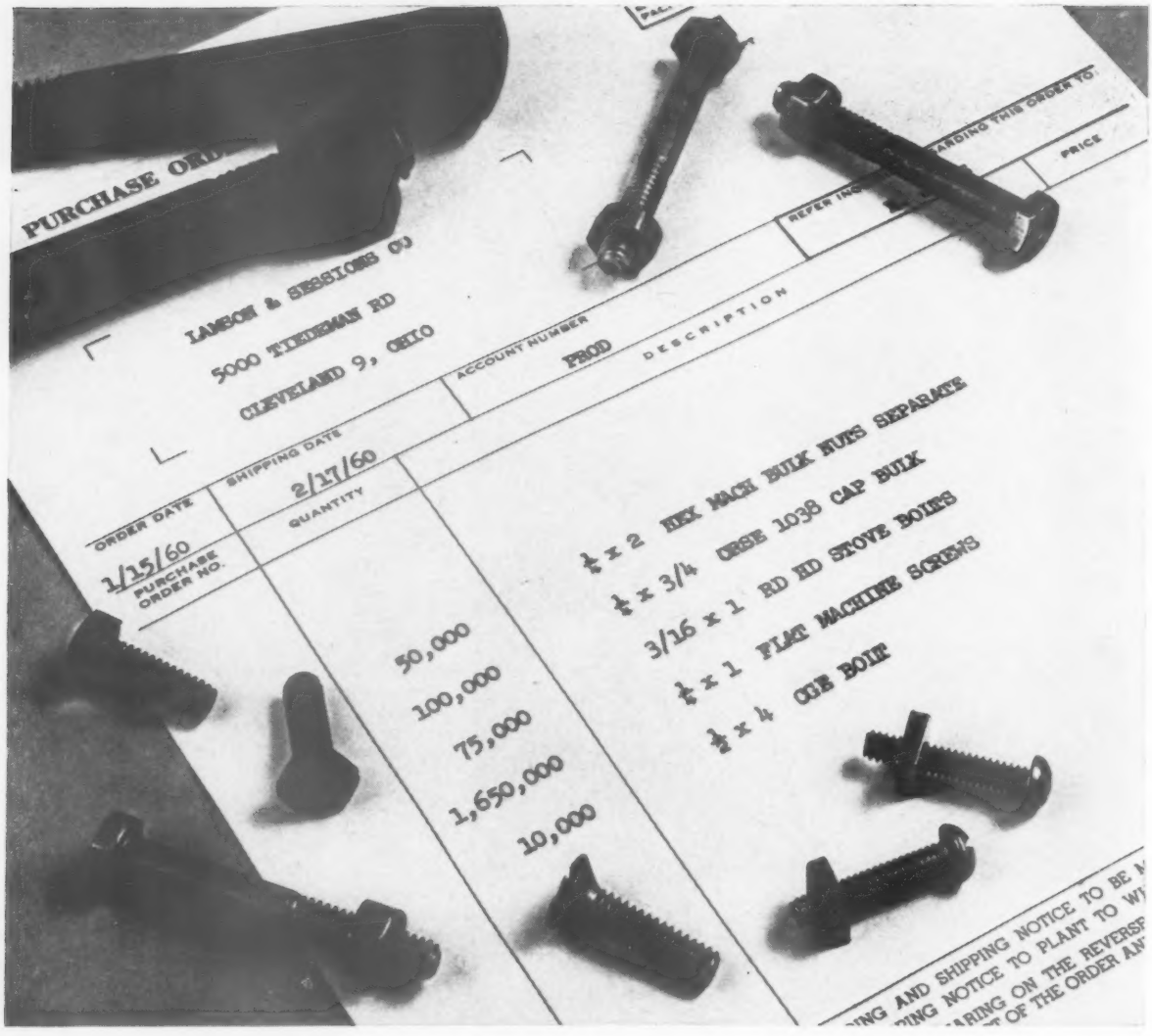

Where to get fasteners when things get rough

In recent months we have been swamped with orders from companies whose "dependable source of supply" had suddenly vanished.

We value these new customers, naturally. Maybe you are one of them. Nevertheless, it's Lamson policy to take care of old customers first. It's an important way of putting meaning into the word "service".

If you buy fasteners in quantity, give serious consideration to making Lamson & Sessions your prime fastener source. Then you will have the best protection available when things get rough.

Why L & S customers are confident customers:

- Production and back-up stocks at *four* fine plants – located to serve you from Chicago, Cleveland, Kent, Ohio and Birmingham, Alabama.
- Complete fastener line – to give you one-order, one-shipment, one-invoice economy.
- Sales engineers in all major areas – factory engineering assistance for your special requirements.
- A 94-year history of continuous production and service.

LAMSON & SESSIONS

5000 TIEDEMAN ROAD • CLEVELAND 9, OHIO

Plants in Cleveland and Kent, Ohio • Chicago and Birmingham

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MARCH, 1960, VOL. 3 NO. 3

WHY TWO STANDARDS OF QUALITY CONTROL?

How many end-product manufacturers insist that their own work be accepted or rejected on the same basis that they accept or reject a supplier's work? Probably very few.

We were never more fully aware of this than at an industry meeting a few months ago. Two executives had just bought identical cars, and were discussing their respective purchases. One was perfectly satisfied with his. The other complained that there was too much of a gap between the doors and the frame.

Their discussion led to the question of why any automotive manufacturer would turn out the same model cars which were identical in everything but the quality of workmanship. The further they got into their discussion, the more apparent it became that somewhere along the line something was amiss with quality control standards.

Here is what their conversation revealed. The locality in which the better quality car was purchased indicated that the car was assembled in a plant which received most of its body components from independent automotive suppliers. The other car was purchased from a dealer who receives his quota from an assembly plant which has body components supplied directly from the parent company.

The two executives reached the conclusion that this company is much more critical of the quality of purchased parts than of their own production.

This same point was brought home again several days ago when we heard about another automotive company which jobs out roughly one-half of its requirements for a particular hardware item which is assembled by riveting.

In order to assure that his parts will meet the purchaser's standards, the supplier buys his rivets from American producers because he has learned from experience that he can rely virtually 100 percent on their quality. In his position in the thinning ranks of automotive suppliers, he just can't afford to take a chance on rejects which could doom him costwise.

Yet, in assembling the same hardware in its own plant, the automotive firm uses many imported rivets. How many poor quality rivets are used in this hardware or other components is anyone's guess.

Both of these examples point up the fact that while industry suppliers cannot afford to take chances with poor workmanship or cheap fasteners, some end-product manufacturers do. These companies, in effect, maintain two standards of quality control.

Companies which indulge in such shoddy practices are not only jeopardizing their position with the buying public, but are alienating suppliers who could play important engineering roles in future cost reductions.

Matt E. Hunter

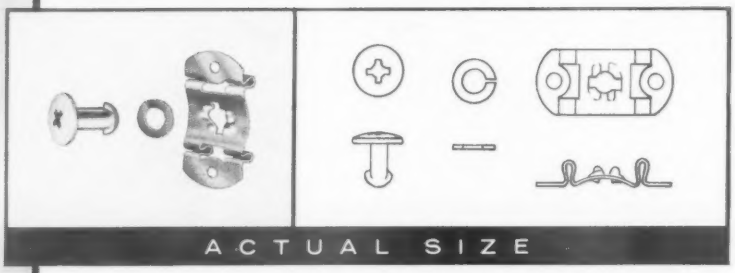
Managing Editor

Now...

miniature

¼ turn

fasteners!



LION *miniature* FASTENERS

¼ TURN OPEN • ¼ TURN CLOSED

LIGHTWEIGHT • STRONG

MINIMUM ENVELOPE

A new size has been added to the Lion family of quick-opening fasteners . . . a miniature size. Small, compact, yet strong and rugged, these miniatures aid in reducing overall dimensions and weight without sacrificing the important advantages of larger Lion Fasteners.

ALIGNMENT NOT CRITICAL

Stud "floats" to accommodate misalignment. The hole in the sheet for the stud has an area 60% greater than the stud diameter. This allows a .030 float in all directions.

WIDE VARIATION IN STACK HEIGHT

Six different studs accommodate total material thicknesses (both sheets) of .040 minimum to .159 maximum.

Total sheet thickness served by any one stud may vary as much as .019 without affecting operation. A Lion Miniature Stud, specified for a thickness of .0863, for example, will accommodate total sheet thicknesses from .080 to .099.

SWAGED-NOSE STUD

Extra strength and smooth operation are made possible by the exclusive Lion swaged nose design. All the metal is put to work. There are no holes, thin cross pins, or milled slots to weaken the cross-section. Case hardening assures long, trouble-free service without wear.

LARGER SIZES AVAILABLE

Lion Fasteners are also available in two larger sizes—No. 5 (mil spec) and No. 2—to meet the needs of aircraft, missile and ground support equipment. The heads are supplied in a wide variety of styles including oval, flush, wing, ring, notched and knurled.

FREE!

FASTENER HANDBOOK

Send for your free copy of Southco Fastener Handbook No. 9. Gives complete engineering data on Lion Fasteners and many other special fasteners.

Write to Southco Division, South Chester Corporation, 257 Industrial Highway, Lester, Pennsylvania.

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LION *Aviation* FASTENERS

one of the

SOUTHCO FASTENERS **LION**

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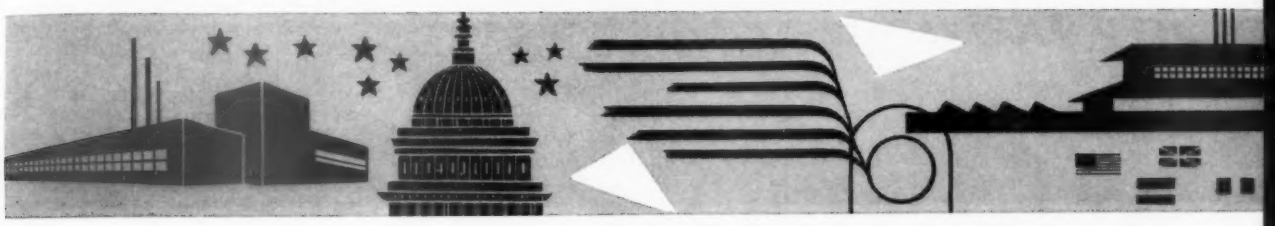
The State of Business



WHAT IS A DOLLAR WORTH?

by **Federal Reserve Bank Economists**
Chicago, Illinois

Discussions of inflation commonly include references to "the declining value of the dollar." In recent months it has been said frequently that "the dollar is worth only 48 cents." This statement means that a dollar will purchase only 48% as many commodities and services at the present time as it would in 1939, as measured by the consumer price index.

It is self-evident that the value of a monetary unit is determined by the quantity of goods and services it can command in exchange. As prices rise, the purchasing power of a dollar declines; as prices fall, its purchasing power rises.

When individual commodities are considered, the value of the dollar does not ordinarily come to the fore. We many note, for example, that wool was priced recently at 43 cents a pound and that a year earlier the price was 36 cents. But we do not think of the dollar as being worth 2.3 pounds of wool, and we do not conclude that the dollar has declined nearly 20% in purchasing power during the past year merely because the price of wool has risen. It is true, in a sense, that there are as many values for the dollar as there are commodities. However, movements in these prices are often quite different. For instance, the prices of many agricultural commodities and imported raw materials are substantially lower than they were in 1947. Prices of most other things are higher, but by varying proportions.

To be useful, the idea of a shifting purchasing power of money must be related to changes in the prices of a wide variety of commodities and services. To measure the change in the value of the dollar, then, requires the computation of an average of many prices. Usually the prices of the individual items are weighted according to their relative importance.

Even the broadest measures of the price level do not attempt to include all prices. Secondhand items, stocks and bonds and real estate prices usually are not included.

To facilitate making comparisons of groups of prices through time, price indexes are constructed. The average of prices as of some specified date—the "base period"—is taken to be equal to 100. The average computed for other dates is presented as a percentage of the base. The base period may be a year or even a shorter period, but it is common to use an average of several years. Presently, many indexes use the 1947-49 base period. The selection of the base period is merely for convenience in making comparisons. It does not indicate, necessarily, that the relationships which existed during the base period were more normal, reasonable or desirable than those in any other period.

PURCHASING POWER—MAY, 1959

Base period	CPI	WPI
1913	$ .34	$.38
1920	.69	.83
1929	.59	.52
1933	.45	.37
1939	.48	.42
1948	.83	.87
1953	.92	.92
1958	1.00	.99

This table shows the different "values" of the dollar (May 1959) which result from using different "base" years for the consumer and wholesale price indexes.

Prior to the time when the 1947-49 base period came into fairly general use, 1935-39 was widely used. In the future, other base periods will be used.

The most widely used indexes of prices are the consumer price index, which measures changes in the prices of goods and services purchased by families of urban wage earners and salaried clerical works, and the wholesale price index, which measures changes in the prices paid by business firms in the primary markets.

The gross national product deflator is a third measure. This index is the result of efforts to remove the effects of price movements from estimates of total spending so that the estimates of total output of the U.S. economy can be presented in "real" terms.

continued

INDUSTRIAL
RETAINING RINGS
cut costs,
simplify assembly

Precision-engineered INDUSTRIAL Retaining Rings . . . internal, external and open types . . . are available in a wide selection of sizes and finishes. Solve your fastening problems simply and economically with the rings that cut machining and tooling expense, save material, simplify and speed assembly.

Series 1000 and 2000 are available *stacked* for quickest application.

Write for free ring samples and catalog.

IRR *Originators of modern retaining ring dispensing*

INDUSTRIAL RETAINING RING COMPANY
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When reference is made to a "48 cent dollar," keep in mind several qualifications. For example, is the particular price index used the most reasonable one available for a particular purpose? No index will accurately represent the purchases made by a given individual or firm. In this sense, everyone has his own price level or purchasing power of the dollar.

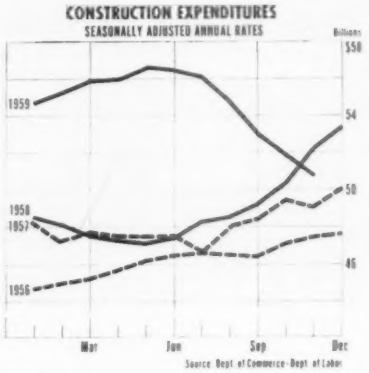
Problems arise when price indexes are used for purposes which require a high degree of precision. For example, the fact that the consumer price index declined or rose a tenth of a point in a given month is often offered as front page news. Those who construct such indexes hardly ever claim such a high degree of accuracy for their product. If the consumer price index were "rounded" to the nearest full percentage point, it would have been unchanged from April 1958 through May 1959, for example.

The difficulty of obtaining accurate price quotations in periods of scarcity or abundance present problems. Special concessions may significantly affect prices actually paid, even though list prices remain relatively stable.

Periods, such as 1946, when many kinds of goods are not available in usual qualities and styles cause trouble.

Comparisons of price movements over long periods of time involve difficulties. This is because of the introduction of new products, changes in the characteristics of existing products and changes in proportions of income spent in various ways. No method has been developed to allow for new products and quality improvements in price indexes.

These limitations do not mean that available measures of the purchasing power of the dollar are without significance. They provide, in a general way, a means of evaluating the nation's success or failure in combatting inflationary pressures. Their limitations are most troublesome when precise measurements are desired. •



Outlays for new construction have continued to drop and in November were below the level of a year ago.

Industry Notes

Machine tool builder Jones & Lamson will lease its equipment, predicting the metalworking industry will adopt the idea en masse . . . A rail strike threat is fading. Management and engineers have agreed to accept binding arbitration. Other brotherhoods are expected to follow . . . Stability at a high level seems the trend for 1960: auto sales are good, not sensational; likewise construction, appliances . . . The State Department is stewing about the massive injection of U.S. private capital into West German armaments. It might provocate Russia . . . Low tariffs for countries with high wages and high tariffs for countries with low wages is imbodied into a new bill introduced by Sen. Kenneth Keating (R., N.Y.) . . . Firestone is part of a $30 million project for making synthetic rubber in India . . . A million-gallon-a-day atomic-powered plant to convert salt water to fresh will go up on the West Coast . . . The U.S. Capitol —its grounds, office buildings and furnishings—was appraised at over $2.7 billion . . . Labor relations expert T. W. Khell says that "the 116-day steel strike means labor peace for that industry for many years. The controversy will leave many scars, but wounds heal rapidly in the face of the eagerness of the workers to work and of the companies to sell steel". . . Labor insiders say that soon-to-retire AFL-CIO president George Meany favors Dave McDonald as his successor, over Reuther. •

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Setko's 23 Years of Progressive Engineering Experience Keeps Screws Modern as Tomorrow's Products

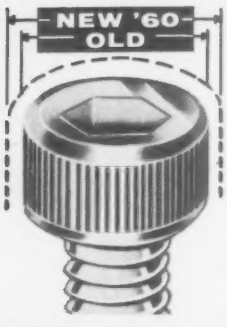
SETKO NEWS

Bartlett, Illinois (Chicago Suburb) Progress Edition

We Specialize in Solving Puzzling Screw Problems

NEW '60* SERIES CAP SCREWS HAVE EXTRA HOLDING POWER

4 BIG EXTRA MONEY-SAVING ADVANTAGES WITH SETKO



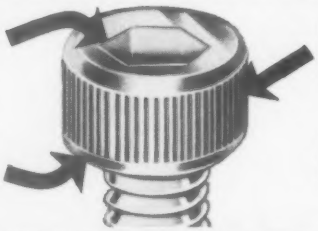
Compare the new head sizes of the new '60 series with the old '36 series and you'll *see* the many *extra* money saving advantages you get. For example: *Broader bearing area under the head* — often eliminates the need for washers. *Bigger head sockets for greater tightening torque* — give more holding power.

You get this extra size only where it counts — in the extra width of the head. (Head height remains unchanged.) In addition, you get *longer service life* and *more re-use value* when you specify Setko '60 series, Cold-Forged, Socket Head, Cap Screws.

LARGER HEAD SIZE PAYS OFF IN SAVINGS

BIGGER HEAD SOCKETS on many sizes take greater tightening torque without breakage or damage.

BROADER BEARING AREA under the head, distributes the load over a larger bearing area. Stops needless indenting of softer metals.



BETTER STRENGTH CHARACTERISTICS assure longer life — can be reapplied more times.

STAINLESS STEEL Cold-forged Cap Screws now available in many sizes.

DATA CHART SHOWS INCREASED SIZES

*'36 series will continue to be available.

Screw Size	Min. Head Dia. Inches		Bearing Area Min. Sq. In.		% Increase Bearing Area	Hex Key Size (Width Across Flats)	
	1936	1960	1936	1960	1960 over 1936	1936	1960
# 2	.136	.134	.006	.006	—	1/16	5/64
# 3	.157	.154	.008	.008	—	5/64	5/64
# 4	.178	.176	.011	.011	—	5/64	3/32
# 5	.200	.198	.015	.015	—	3/32	3/32
# 6	.221	.218	.019	.019	—	3/32	7/64
# 8	.265	.262	.026	.026	—	1/8	9/64
#10	.306	.303	.036	.036	—	9/64	9/64
1/4	.367	.365	.044	.044	—	5/32	5/32
5/16	.429	.457	.052	.070	33	7/64	1/4
3/8	.553	.550	.111	.111	—	5/32	5/32
7/16	.615	.642	.147	.200	36	5/32	3/8
1/2	.739	.735	.183	.183	—	3/8	3/8
5/8	.863	.921	.216	.293	35	1/2	1/2
3/4	.987	1.107	.224	.424	89	9/16	5/8
7/8	1.111	1.293	.253	.585	131	5/16	3/4
1	1.297	1.479	.405	.768	89	5/8	3/4

For dimensions on 36 series see latest Setko Catalog.

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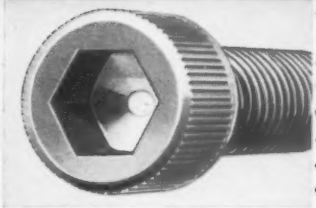

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"PERFECT-HOLE" SOCKETS
assure perfect key engagement!

You can exert maximum torque for *total* holding power because the hex socket is perfect. Permits perfect engagement of hex key against all of the bearing walls of the socket. Pressures exerted on the socket, are perfectly equalized for maximum driving power. Cap Screw life is extended and more re-applications are possible. Specially designed machinery and die tools, built to Setko specifications, are the reason for these cost-cutting, life-lengthening, money-saving, *plus* features.

Ask for free test samples

NEW FOLDER GIVES ALL THE FACTS

Contains complete specifications, dimensions and information about the new Setko '60 series of Cold-Forged, Socket-Head, Cap Screws. Fill in the coupon below, tear out and mail today. Ask for free test samples. Send us your requirements for advantageous quotations.

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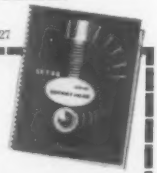
Set Screw & Mfg. Co.
705 Main Street
Bartlett, Illinois



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☐ Send me test samples of size ....'60 Series Cap Screws.
☐ Requirements attached, please send me your advantageous quotations.
Please write your name, company and address on the margin of this page.

Industry at Work

HOW BRITISH FIRM REORGANIZED PARTS HANDLING TO SPEED TOOL ASSEMBLY

Black & Decker Ltd., Harmondsworth, England, is saving production time and floor space after reorganizing its methods of handling and storing thousands of parts used in the assembly of portable electric tools.

Substitution of a tote box mobile racking system for static binning has been the biggest change. Application of the system to the small parts warehouse has halved the space formerly required, with the installation of rack assemblies for nesting four tiers of boxes—two on either side of a gangway, and mobile racks mounted on rails as the inner tiers. The metal tote boxes are in two standard sizes—12″ by 12″ by 6″ and 24″ by 12″ by 6″.

The box supports in the mobile racks are angled so that the contents can be clearly seen and part picking is simplified. Parts are stored according to a sequential letter/number code, and details from incoming orders are transferred to location sheets which are used by the pickers to ensure progressive work without the need for backtracking. Information from the sheets is also used to maintain a running inventory.

Incoming stock arrives in unit quantities and in standard boxes which are loaded directly into the racks. This extensive use of standard containers has led to smoother and faster working in the production and assembly sections.

From the goods inward bay, onwards materials move through the factory in corrugated box pallets or tote boxes in a series of standard sizes. Some of the basic raw materials, including rough castings, arrive at the factory in the company's own box pallets. The pallets not only reduce handling but enable quantity checks to be carried out by weighing.

Operators take work from the full pallets and place it in a similar container upon completion. The system of using similar containers for similar parts is rigidly adhered to and failure to do so can lead to the rejection of a part at any of the inspection stages.

Work from the machine shop is progressed to the production store which flanks the intake end of the lines in the main assembly shop. The store consists of two main sections, one holding box pal-

continued

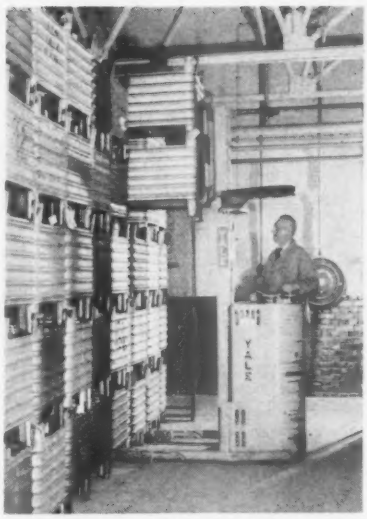
Components are handled in box pallets through all stages of production to assembly.

Outer racks run on slide rails in this racking system for small parts.

lets stacked four to five high and the other consisting of 12 racks each holding 13 tiers of boxes.

This system has increased storage capacity by at least 40% and greatly improved distribution to the assembly lines. Instead of loading into separate containers and off-loading, the job is now done in a fraction of the time by serving the lines with pallet or box loads taken directly from the racks. It is planned to extend the assembly lines right up to the production store and thus eliminate the transfer operation altogether.

Passage of work along assembly lines has been simplified by the construction of 50 ft. long runways between the benches along which parts, sub-assemblies and complete units are carried on wheeled trays.



Use of corrugated box pallets has increased storage capacity by 40%. Assembly lines are served with box or pallet loads taken directly from the racks.

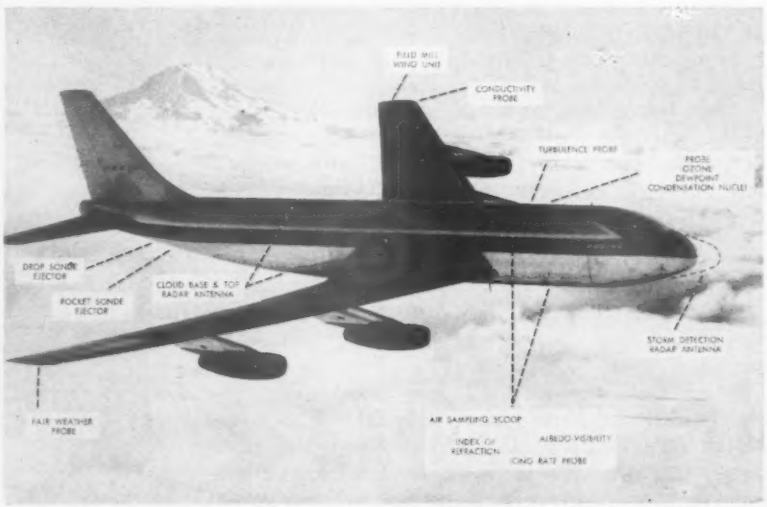
WEATHER LABORATORY SET UP IN BOEING JETLINER

A flying weather laboratory, installed and test-flown in Boeing's 707 prototype jetliner, has successfully completed flight tests designed to gather and analyze global weather data for improved forecasting.

Developed by an industrial team headed by Bendix Aviation Corp., the weather project is described as the most significant advance in meteorology since weather stations first were linked by telegraph, said Dr. Russell D. O'Neal, general manager.

Boeing's role in the program, as a major subcontractor to Bendix, is in developing vital sensing equipment for probing the stratospheric elements.

The jet testbed, crammed with electronic sensing and computing devices, flew some 7000 miles at altitudes up to 45,000 feet. To give the airplane a three-dimensional reach, two kinds of launching tubes released instrumented containers—rocketsondes and dropsondes—which measure barometric pressure, temperature, ozone content, dew point and other data from sea level to 170,000 feet altitude. The former were not "live." •



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Do you have a fastener problem? TRIMCLIPS have been widely known and used in the automotive, radio, stove, refrigeration and aircraft industries most extensively for attaching trim panels and mouldings to the structure.

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WESTCLOX extends die life with KEYSTONE WIRE

From precision parts—such as these fasteners made from Keystone "XL" Wire—come the quality that has made WESTCLOX the most famous name in timepieces.

The Westclox Division of General Time Corporation, LaSalle, Illinois, is the world's largest manufacturer of timepieces. For years, millions of their famous Big Ben and Baby Ben clocks have started the day for more people than any other timepiece.

Keystone "XL" Wire has played a key part in "clockwork" cold heading of the millions of tiny fasteners—rivets and screws—that are a part of the "works" inside. From small .032" to .116" Keystone wire, some 170,000,000 fasteners are headed in a year. Precision of such tiny parts is important for high-speed assembly of quality timepieces.

Fifteen years ago Keystone metallurgists were called in at Westclox . . . analyzed wire use . . . die design . . . and recommended a wire that solved an excessive die wear problem. Today, one special carbide die at Westclox has headed an estimated 4-million parts . . . and is still in use after 12 years of operation. Keystone "XL" Wire is the big favorite on Westclox fastener heading today.

The *flowability* characteristic of Keystone "XL" Wire is the secret of success . . . it's a wire that practically "flows" through dies to form the most extreme shapes . . . with less die wear . . . greater precision . . . reduced waste.

Want a Keystone Wire Specialist to help you save money and improve quality? Write for details!

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KEYSTONE XL WIRE STUDY

KEYSTONE

WIRE FOR INDUSTRY

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Whatever you require in pre-assembled washers... SEMS, and neoprene or nylon washer STAPS®... in thread-forming and thread-cutting tapping screws, or machine screws... with slotted, Phillips or Hex heads... P-K can supply them all through your local P-K Distributor.

P-K SEMS reach your assembly line pre-assembled, ready for instant use. Washers cannot come off—can never be mislaid or misplaced—insures washers on screws... not on the floor! Double inventory and double parts handling is completely eliminated.

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STAPS® are standard P-K fasteners, pre-assembled with nylon or neoprene washers for effective control of leaks, squeaks, crazing and electrolysis, in all types of metal structures and assemblies.

Your nearby P-K Distributor can meet your needs. Call him for samples and complete information.

PARKER-KALON® fasteners

Keep American Industry at Work... Buy P-K... made in U.S.A.

PARKER-KALON, a division of General American Transportation Corporation, Clifton, New Jersey. Offices and warehouses in Chicago and Los Angeles.

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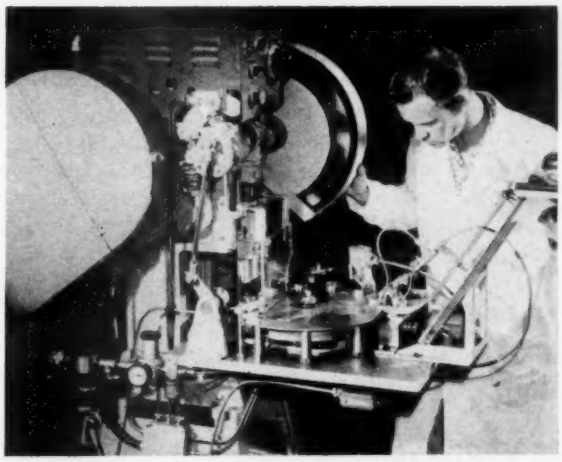
Assembly and Fastening Ideas

DIAL-FEED PRESS AUTOMATES ASSEMBLY

Rosan Inc. of Newport Beach, Calif., manufactures floating press nuts. In assembling these two-component panel fasteners the window in a retainer must match the wings projecting from the captive nut. Formerly they were hand assembled and hand fed into a press to produce 200 nuts an hour.

Now, an automated setup turns out 2500 assemblies an hour. Tooling ingenuity by Rosan also permits setup changeover for any of 10 sizes in less than an hour.

Automatic assembly equipment had to satisfy two pre-requisites. It had to hopper-feed and orient the parts exactly. It had to protect itself from damage and minimize scrap losses in event of mechanical malfunctioning. Kenco's Electro-Safe press is doing this job. Safety controls stop the machine instantly if improper assembly occurs.



A dial press assembles 2500 press nuts an hour.

Rivets are inspected with a sensing head and computer.

BOEING INSPECTS RIVETS ELECTRONICALLY

Boeing Airplane Company, which buys one hundred million rivets in 332 categories each year, has developed an electronic device which will show to the ten thousandth of an inch any deviation from standard.

Up to now, the task of measuring sample batches and determining deviation has been done by hand-gauging. Using the new device, it will be possible to measure a batch of 50 rivets and come up with an acceptance or rejection figure, automatically averaged and computed, in one third the time formerly required. Further speeding of inspection by automatic rivet handling and an improved computer, now in design stages, is expected.

The rivet-head inspector was created by engineers of the Transport Division electrodynamics staff, working closely with quality-control engineers of the Aero-Space Division. In addition to reducing the time and cost of rivet inspection the new device promises increased accuracy.

The device consists essentially of a gauge block,

continued

this is your

DOWEL PIN

check list

Frankly, these characteristics are standard with Acme Dowel Pins. If all 5 are not standard with your dowel pin source, obviously, your operation deserves further Acme information; in all probability, Acme pins.

1 PRECISION Hardened and ground to .0002" or .001" over nominal diameter. Also available: oversized .002", .003", .004", .005".

2 HARDENED Case hardened to 60-62 Rockwell "C" scale.

3 SIZES 132 standard, ⅜" to 6" lengths, ⅛" to 1" diameters. Special on request.

4 SAFETY Breaks before bending or mushrooming, no misalignments or major damage.

5 SPEED No faster delivery, no more reliable source or brand.

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sensing head and simple electronic computer. Before measuring production rivets, a master rivet is placed in the gauge block to set up a reference level. Then rivets are placed in the gauge block one at a time. In the sensing head, a push-button drops a protrusion-measuring stylus onto the rivet head. Attached to the stylus, the movable core of an electro-mechanical transducer translates the measurement made by the stylus into an electrical potential difference which is proportional to the displacement of the stylus. This difference is amplified and supplied to the computer, which determines any deviation, first for each rivet, then for the batch as a whole.

The prototype rivet inspecting device consists of an electromechanical transducer, balancing circuits, oscillator, amplifier, computer and power supply. An improved computer, now in design, is expected to further refine the process.

UNIT SPIKE WELDS COATED METALS, ELECTRONIC PARTS

A new type "spike" welder, capable of 500 welds a minute, plus blemish-free welding of coated metals and ⅛" aluminum pieces, promises a major breakthrough in solving many difficult welding problems. The new welder produces 100,000 plus amp. pulses of approximately one millisecond duration, yet requires no additional service lines.

Vinyl-clad steel receives studs, slips and brackets with spike welding, without damaging the plastic.

The unit has been developed by Weldex Division of the Metal/Craft Company, Detroit. Its engineers said that units have been out in the field doing trial production welding for the past five months. The unit employs standard electronic "spike power" controls made by Robotron, Inc.

Don Dunnabeck, Metal/Craft president, cited three successful applications of this new welder to demonstrate its versatility.

At a special showing before automotive engineers, studs, clips and brackets were welded on vinyl and lacquer steel without damage or discoloration to the coating. Production on such parts is 500 pieces per minute. Capacitor discharge welders require 2-3 seconds for recovery.

Other similar applications include the welding of chrome and copper plated metals, dissimilar metals and nonferrous metals.

The Weldex unit will also perform qualification welds in joining pieces of ⅛" aluminum stock. Normally, this application requires 200 kva welders.

The unit is capable of critical welding of small parts, where too much heat would damage the enclosure or perhaps delicate electronic contents. One of the first such Weldex installations was for an Eastern transistor manufacturer. With conventional welding techniques in joining the case and base, the maker was experiencing 20 to 30% scrap due to excessive heat from the welder. This loss has been practically eliminated. The reason for this, states Weldex, is that the extremely short time duration of the welding pulse prevents the heat from penetrating any further from the shell, where it is supposed to be. •

A NEW IMPACTOOL

...WITH EXTRAS THAT PAY OFF FOR SMART TOOL BUYERS!

6-Vane Air Motor

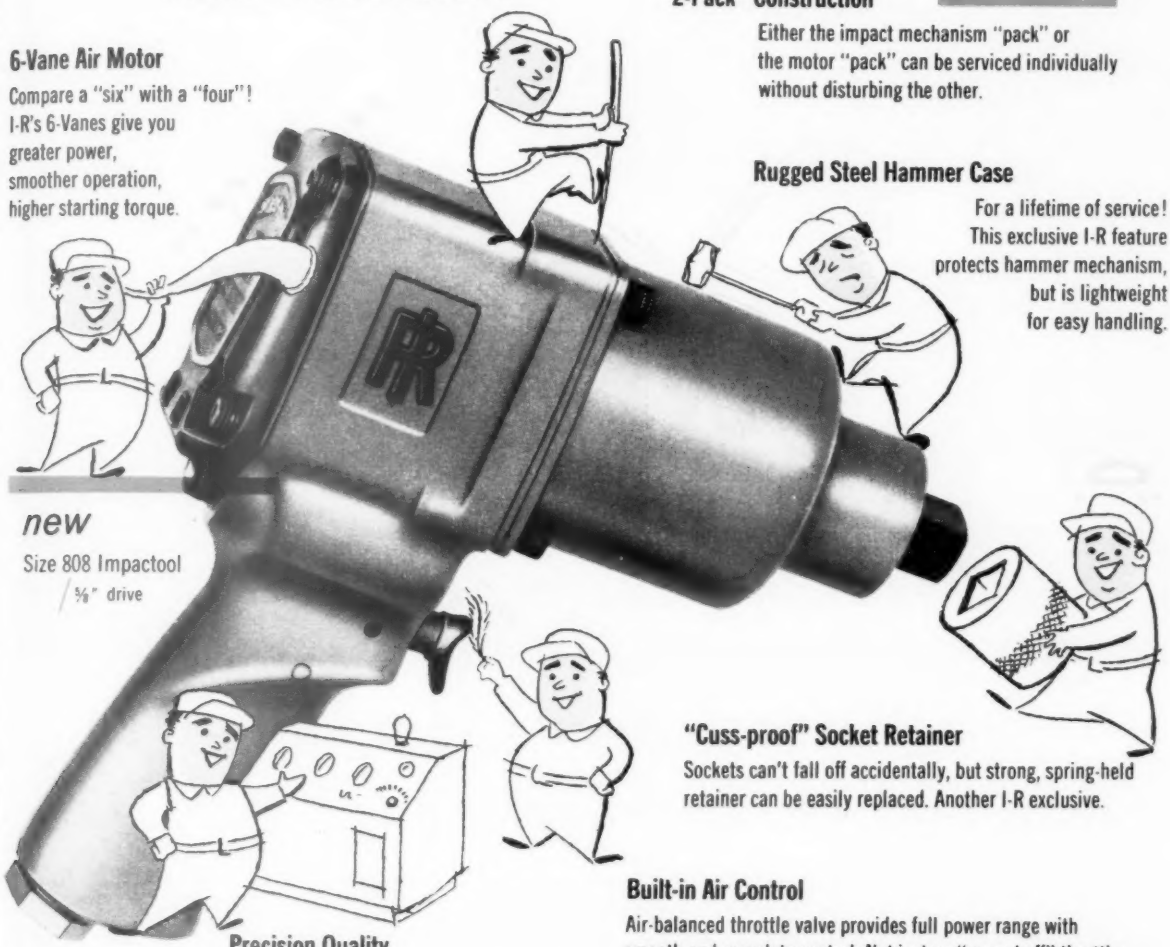
Compare a "six" with a "four"! I-R's 6-Vanes give you greater power, smoother operation, higher starting torque.

"2-Pack" Construction

Either the impact mechanism "pack" or the motor "pack" can be serviced individually without disturbing the other.

Rugged Steel Hammer Case

For a lifetime of service! This exclusive I-R feature protects hammer mechanism, but is lightweight for easy handling.



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Size 808 Impactool

⅝" drive

"Cuss-proof" Socket Retainer

Sockets can't fall off accidentally, but strong, spring-held retainer can be easily replaced. Another I-R exclusive.

Built-in Air Control

Air-balanced throttle valve provides full power range with smooth and complete control. Not just an "on and off" throttle.

Precision Quality

Special electronic equipment double-checks machined parts for perfect mating of all surfaces and bores.

LOOK FOR I-R EXTRAS BEFORE YOU BUY!

Smart buyers and experienced tool men know these Ingersoll-Rand EXTRAS pay off . . . in terms of longer tool life, easier maintenance, and better nut running performance. With them you get 20% more power and 200% faster rundown in a precision tool so small (7½") and light (8⅞ lbs.) you can use it anywhere.

For details on the all-new Size 808 Impactool, call your I-R representative today. Or write: Ingersoll-Rand, 11 Broadway, New York 4, N. Y.

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Tools plus AIRengineering increase output per man

34A-8

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Plastic fastened to metal— firm and weather-tight with RIVNUTS®

Large transparent plastic panels form the cockpit windows of the Vertol Aircraft Company's new YHC-1A helicopter. The plastic is firmly secured to the airframe by B. F. Goodrich RIVNUTS. About 300 are installed—quickly and easily—resulting in a finished seal that withstands both vibration and weather extremes.

One man fits the RIVNUTS into the hat section, working from one side. These RIVNUTS act as blind nutplates. Attachment screws tighten the molding strips, rubber and plastic in a firm, weatherproof grip.

This use of blind-fastening RIVNUTS insures a simple and very satisfactory method of window installation. In case after case, RIVNUTS speed assembly, cut labor costs, simplify design. If you'd like recommendations on a specific fastening problem, please send a print of your part.

YOU CAN IMPROVE FASTENING IN SHEET METAL, TUBING, TANKS WITH RIVNUTS

New RIVNUT Data Book visualizes how RIVNUTS work, shows construction and ease of installation in many forms or types of materials. For free copy write Dept. AF-3, *B.F.Goodrich Aviation Products, a division of The B.F. Goodrich Company, Akron, O.*

B.F.Goodrich *aviation products*

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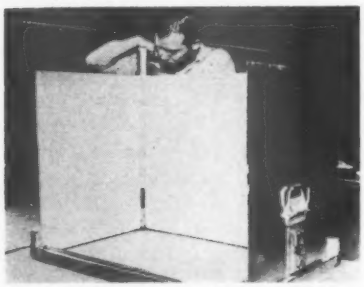
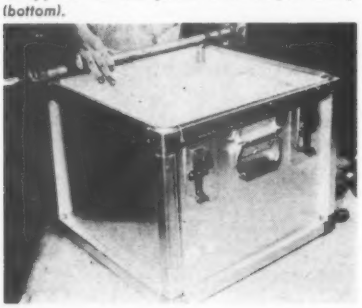
BONDING SHIPPING CASES ANSWERS NEED FOR ECONOMICAL, SHORT-RUN ASSEMBLY METHOD

Adhesive bonding to assemble metal, water-tight shipping containers has reduced production costs 25% at Zero Mfg. Co., Burbank, Calif.



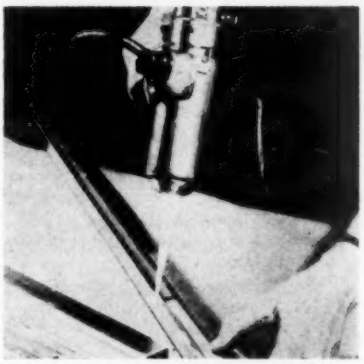
Inserting side panel sheets (top) into adhesive-filled grooves of the frame extrusions. Pressure is applied to the joints with simple clamp (bottom).



These containers, used for electronic instruments, must meet military specifications. Many intermediate sizes and shapes are required; supplying the entire range of large size containers would present problems of finished goods inventories. Therefore, to quickly supply required sizes with efficient production methods necessitated a new concept in container design.

The problem was solved by assembling the entire container by bonding. This permits lighter gage metals, the assembly of heavy gage extrusion frames to thin side sheets without danger of tearing the thin sheets. The adhesive's void-filling properties eliminates the need for close tolerance machining of mating parts and hole drilling for mechanical fasteners.

During assembly the extrusions are first cut to length. Special corner castings containing integral cast adhesive reliefs are used to form each corner, then filled with 3M one-part epoxy adhesive EC-1386. The extrusions are slipped over the corner castings.



Adhesive is applied to frame extrusion.

When the framework has been assembled, the grooves are filled with adhesive. Stressed sheets are then inserted into the grooves on the frame. The assembled container is squared and banded with a steel strapping tape, and oven-cured at 350°F for an hour.

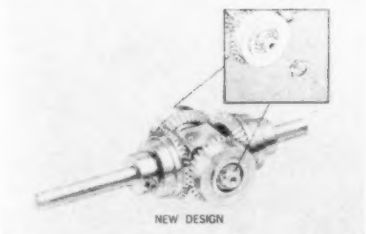
The liquid adhesive has a shear strength of 4670 psi at room temperature, 4670 psi at 180°F. It is designed to serve temperatures of from minus 67°F to plus 250°F.

RETAINING RINGS IMPROVE DESIGN, SPEED ASSEMBLY OF MINIATURE DIFFERENTIALS

Dynamic Gear Co., Inc., Amityville, N.Y., has improved the design of its differentials and cut costs through a simple re-design of fastening methods.

The company produces solid and hollow-shaft differentials for electronic and electro-mechanical applications.

In the Dynaco model D-155 differential, two Truarc Series 5100 rings retain class V ball bearings on each side of the spider gear shaft. The rings are seated in grooves pre-cut before the parts are assembled. The fasteners are installed with retaining ring pliers which grasp the lugs and expand the rings for axial assembly over the shaft.



NEW DESIGN

In the original design, the bearings were retained with set collars and set screws. Because the screws did not provide the positive lock required to maintain the backlash tolerance, holes were drilled through the collars and shaft on each side and the parts

continued

It's Easier and Less Costly

to **BUY MELLOWES LOCK WASHERS**

because of Mellowes Functional Packaging

Reducing labor costs is primarily a problem of reducing material handling . . . in the shop or in the warehouse . . . and packaging has become an important factor in the continuing battle for lower costs. The products of a supplier who helps you reduce material handling costs are your *best buy*. That is why Mellowes, the originator of Coin Pak, packages *lock washers* as you want them; offers you a choice of modern functional packaging: —

Coin Pak paper tubes with crimped ends—the *most compact* method ever devised for packaging lock washers. Saves you valuable shelf-space, eliminates waste, prevents spilling and mixing of sizes.

2-label, 2-way, color-coded cartons, for Lock Washers in Coin Pak or in Standard Quantities. Designed for upside-down stacking, they prevent the bottom from falling out when box is lifted — no spilling or waste. Instantly readable end labels speed packing, unpacking and filling orders.

JOB-PAK, the modern bulk package for lock washers, gives you the contents of a keg in ONE shipping container . . . divided into 6 inner cartons labeled and counted.

You save money with JOB-PAK because it makes it easy to handle and distribute bulk lock washers, provides re-usable containers, permits bulk quantities to be stacked on shelves with other packaged goods, saving valuable floor space.

Mellowes bulk packages are strong and sturdy (350 lb. single-wall outer carton and 350 lb. double-wall inner); can be stacked or palletized.

Yes, Mellowes modern, functional packaging, and other Mellowes policies, make it easier and less costly to buy your lock washers from Mellowes. Write for the complete story.

The Mellowes Company
143 E. Nash Street • Milwaukee 12, Wis.

A. W. Mellowes,
Founder and Chairman of the Board

Note:
This is one of a series of advertisements presenting Mellowes customer-service policies which benefit you, the buyer of Lock Washers.

A8-2016-½

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staked with dowel pins. The press fit required for the dowel pins often caused distortion of the shaft.

Cost for parts, machining the dowel pin holes and assembling the spider gears totaled $4.50 per unit. The two retaining rings and grooves cost $.57, for a saving of $3.93 per unit. Assembly time has been reduced from six minutes to ten seconds per unit, for a saving of about 97%.

In addition, the rings permit Dynamic to shorten the spider gear shaft and reduce the size and weight of the gear assembly. Use of the smaller shaft, with thin rings replacing set collars, decreases the tumbling circle of the spider gears—a critical factor in miniaturizing both the differential itself and assemblies in which the unit is used. Reducing the size and weight of the spider gear assembly lowers the moment of inertia of the gears around the axis of the input and output shafts. This provides greater uniformity in gear revolutions and increases the accuracy of the differential.

The retaining rings may be removed easily and re-used, facilitating disassembly of the spider gears for final inspection or field adjustment. This was a difficult operation when the parts were staked.

NORTH AMERICAN FREEZES HONEYCOMB BRAZED METAL

Metal hardening by deep freezing is not a new technique, but two aircraft manufacturers may be popularizing the method.

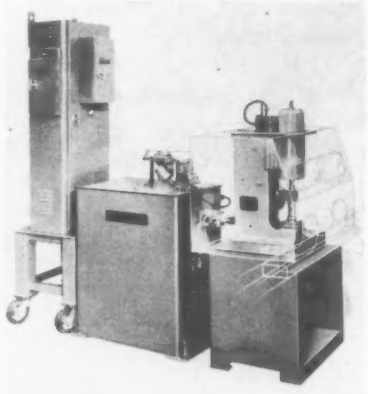
North American Aviation, Inc., has installed a $140,000 Tenney brine chiller in its Columbus, Ohio, plant as part of the new method of fabricating B-70 wing sections by honeycomb brazing. Chance Vought will follow.

After being brazed at 1650°F, the stainless steel structure is air-cooled to 100°F and then frozen. The 16x26x7 foot tank will produce minus 120°F and will handle a mass load of 14,000 lbs. in about 150,000 lbs. of methylene chloride brine. The extreme cold bath hardens and stabilizes the metals.

SIMPLIFY WELDING SMALL PARTS IN CONTROLLED ATMOSPHERE

Standard resistance welders have been designed for welding semiconductors and other small electronic parts under controlled atmosphere conditions.

All air, water and electrical supply lines are carried to the electrodes inside a hollow C frame. This compact design leaves a minimum of area for sealing to dry box walls, and gives a maximum of clearance around the welding area for handling material in and out of the electrodes. The frame and short throat also maintain electrode alignment and surface parallelism.

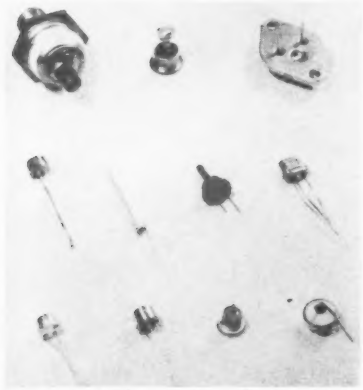


C-type magnetic force unit welds under controlled atmospheres.

A popular size of C-type magnetic force welding unit manufactured by Precision Welder and Flexopress Corp., develops 2200 lb. weld pressure and accommodates transistor assemblies having a ring projection diameter up to approximately 1.250".

These welders are making main seal welds on transistors with 98% average yield. Much of this success can be attributed to the magnetic force principle, which uses the same current surge that heats the weld area to exert magnetic force on the electrodes for forging the weld. The result is forging at the exact moment of maximum ductility, shortened weld time, and less residual heat in the parts after welding.

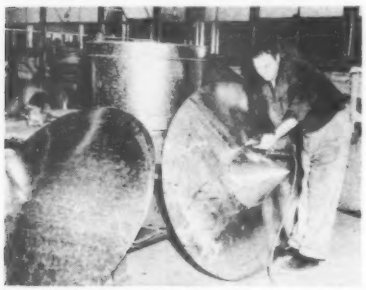
Precision's welding gun eliminates many of the problems asso-



A ring weld on typical transistors joins a protective can to the base.

ciated with critical atmosphere welding. Air for the cylinder which moves the upper electrode for loading and unloading, and water for cooling the electrodes, transformer, and connecting conductors, are piped in through the frame. Connections are made to manifolds outside the dry box, so that no air or water can enter to contaminate the controlled atmosphere. The electrodes can be changed without getting water in the dry box.

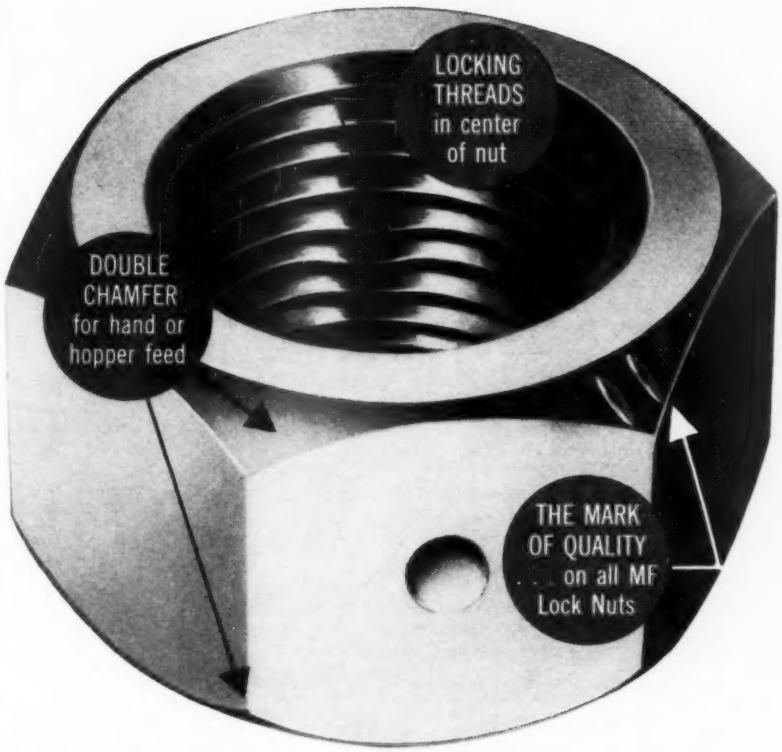
POWER TOOLS, LOCK BOLTS DOUBLE ASSEMBLY OUTPUT



A cone section to roof vent cover is being fastened with locking bolts. Power tool assembly technique has doubled output.

By switching to power tool assembly and specifying lock bolts, Binks Mfg. Co., has doubled productivity while halving its manpower needs.

The Franklin Park, Ill., manufacturer fabricates galvanized ducts, elbows and covers for industrial painting systems. At one time one man hammered solid rivets while a second man held a bucking bar. The new method, using Huckbolts and pneumatic tools, has reduced installed costs 45%. •



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Fastening Techniques for PLYMOUTH'S Unibody

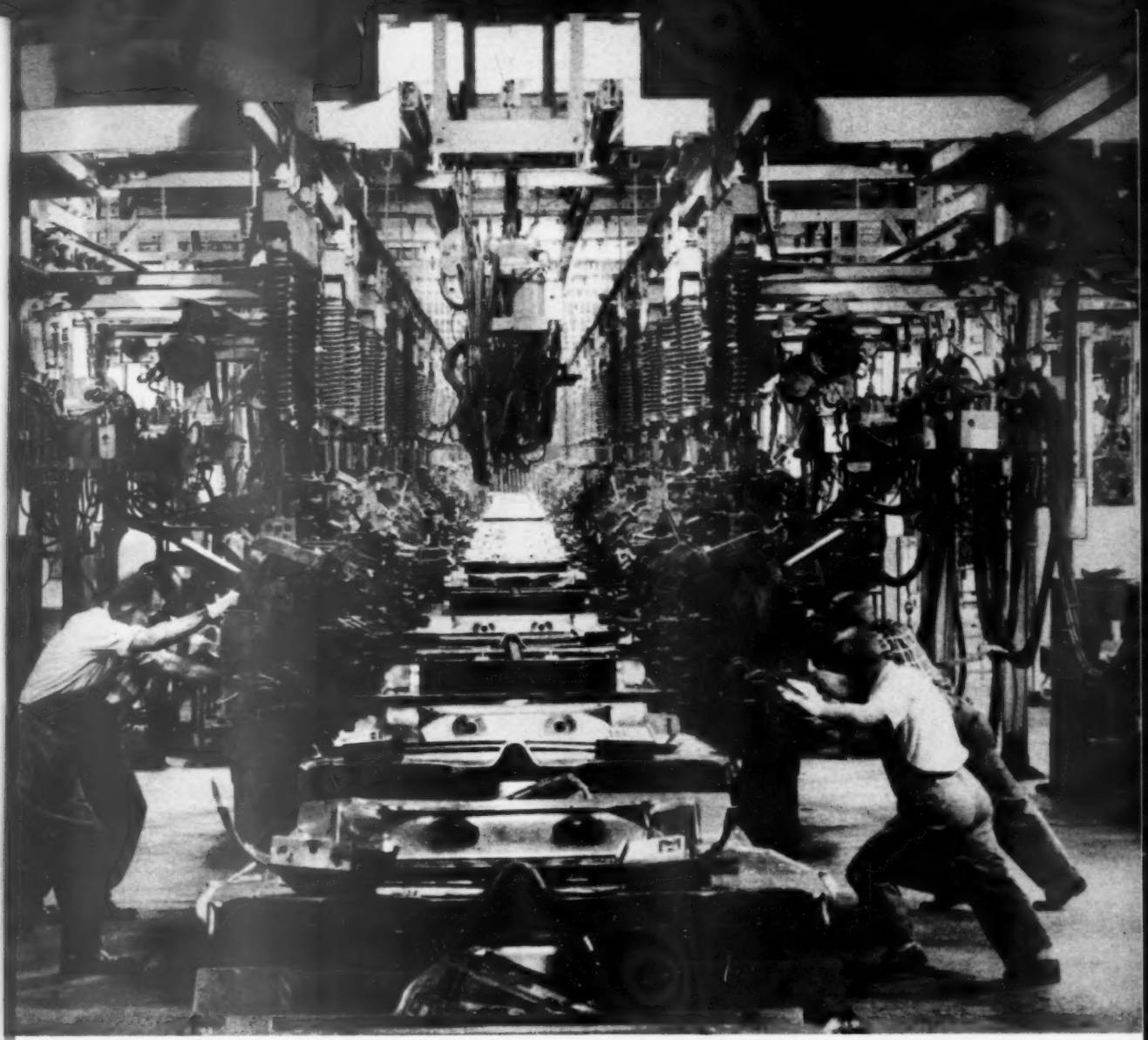
by **Darrell Ward**
Engineering Editor

The all-welded unit body further dramatizes the importance of proper fastening. Here's how Plymouth places emphasis on hardware, torque, inspection.

Plymouth made big news recently with a two-year, multi-million dollar expansion and modernization program at the Detroit Assembly Plant. Object: to make the historical switch into unibody construction. The company proclaims that the combination of unitized construction and a vastly improved quality control program has resulted in the best-built car produced by the company since its beginning 31 years ago.

No one can argue with the advantages of unibody construction. It is a masterpiece of sheet metal fabrication. But, while all this news is breaking, engineers are reminded that no machine like an automobile, with all of its complex functional parts and assemblies has been, nor is it expected to be, completely fabricated with formed and welded sheet metal. There is much more under the hood and a good deal under the floor pan, behind the instrument panel, and inside the body. Functional units and assemblies must be fastened together. Nearly all must be fastened in such manner that a service station or garage can remove, replace or repair parts which may become defective.

Plymouth hasn't overlooked this fact. The truth is that their



Fixtures are placed on the gate-line on the 352-ft. body framing line. Sides, floor and roof are clamped and welded.

improved quality control program is vitally concerned with numerous fasteners—screws, nuts, bolts, studs, clips and a multitude of others—all along the assembly line and particularly at inspection points.

Where power tools are used on the assembly lines, torque ratings are established for each individual job, on the job, by adjusting the tool to develop engineering specified tightness. Tools are preset when repaired and the torque setting is checked daily on more than 50 points of the car with a direct reading torque wrench.

Hand tools and power tools are in use at various work stations along the final assembly, according to the practical needs of each station. Hand screwdrivers usually are employed by a workman who has one or two other job functions to perform. The rule is, however, that anywhere an air power tool will save time, use it.

Special clips and fasteners are selected on the basis of four major qualifications. Each fastener must first of all do the job it is intended to do. It must be easily applied. It must be in line for cost. And, it must be easily installed within proper time limitations.

The accompanying photographs highlight some of the facts much better than a lengthy discussion.

Unibody construction actually enhances the importance of fasteners and focuses the spotlight on top quality parts and methods. With a super quiet rigid body, detachable units and the fasteners that hold them together had better be good. It is possible that with this radical change in the automotive industry, more attention will be given to strength of fasteners and proper torque as already has been done at Plymouth. There likely will be improvements in the quality of standard fasteners. And, there is a market for new types of specials which will be required to conform to the changes in styling and functional problems encountered.

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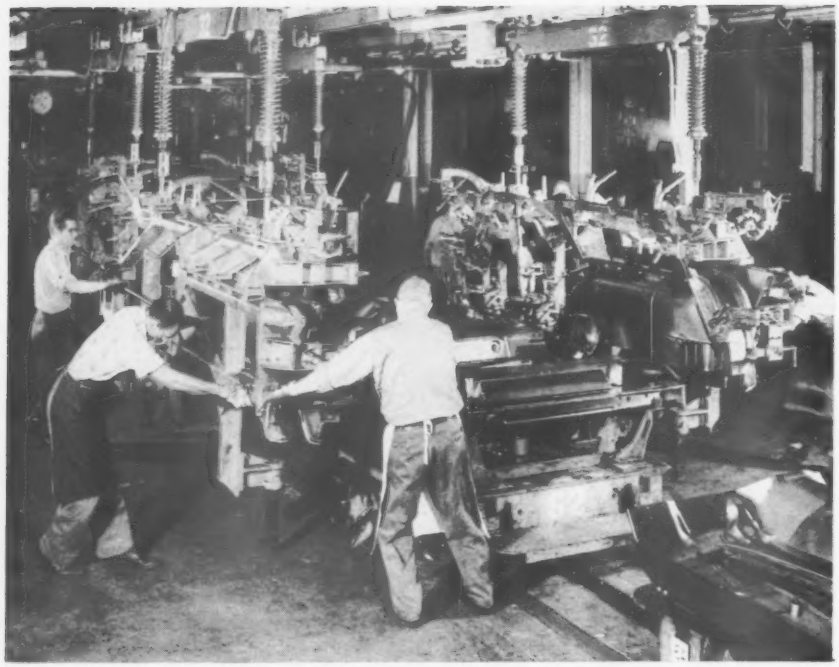
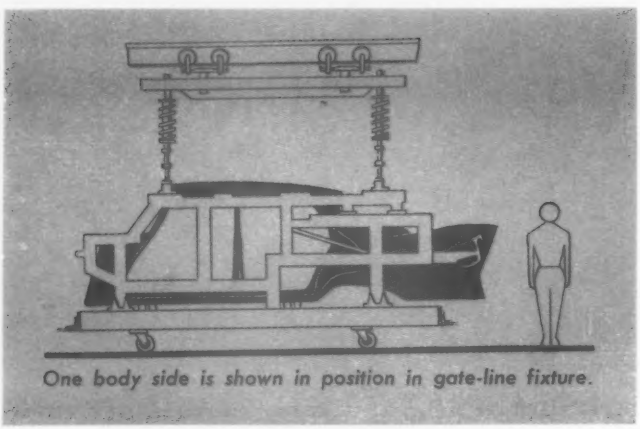


← *At the start of the main gate-line, the sides of the car body are swung into position in their fixtures and clamped to floor pan.*

↓ *In the seventh stage of rustproofing, a 1960 Plymouth body is eased into the four-foot deep tank of anti-corrosive solution.*



One body side is shown in position in gate-line fixture.

Let's get a more comprehensive look at how big this changeover to the unibody was at Plymouth. When one examines a few facts of the giant operation, it is easy to understand why all automobile manufacturers cannot jump into such a new idea from one model to the next.

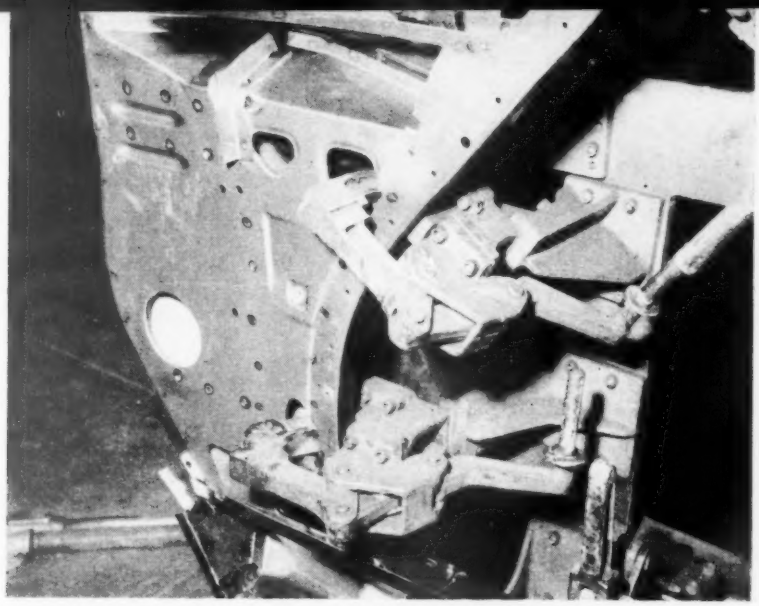
The Detroit Plymouth Plant has an increased area of 57,000 square feet, bringing the total floor space to 1,300,000 sq. ft., the size of 26 football fields! The latest additions bring the total floor space to more than triple that of the original plant.

All this was necessary in order to transfer body assembly from the former Mack Avenue Plant to the Plymouth Assembly Plant. The six-cylinder engine machining and assembly departments which occupied nearly 25% of the original space were moved to the Trenton Engine Plant. New space had to be provided for a huge rust-proofing operation which coats new Plymouth bodies.

A new "gate line" was installed for framing the entire body, from floor pan to fenders, on a continuously moving line. Along the line are 339 new welding machines having an average weight per machine of 685 pounds. There are 64 bases and 32 sets of side frame fixtures on the line where bodies are welded together.

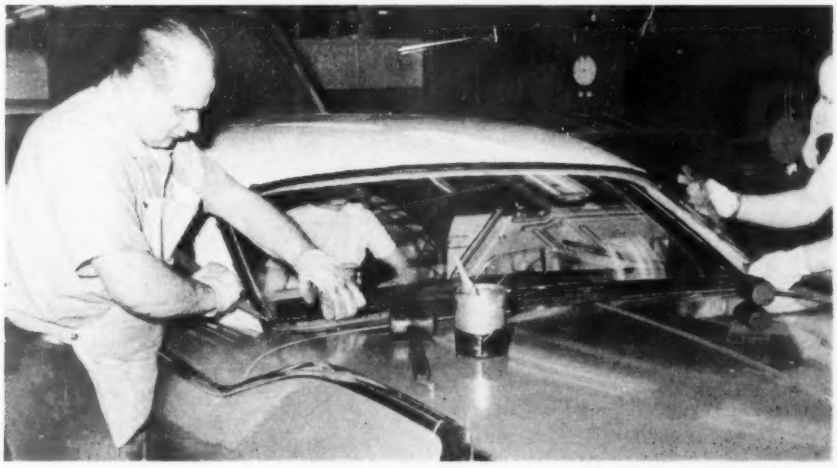
Practically all of the assembly and sub-assembly lines were relocated or altered. The final assembly line grew from a length of 1,000 to 1,972 feet, carrying at all times during the working day a total weight of 368,000 pounds of new cars. A total of 146 overhead conveyors were replaced by 127 new ones in a more efficient layout. Before the change, there were 27 miles of conveyors. These were replaced by 21 miles of new ones.

During the two-year renovation process, the plant continued producing 1958 and 1959 models with no lost production time from construction activities.



The side cowl is positioned in an assembly fixture. Locators and clamps shown set the sizes of the windshield and front door openings.

A lipping tool and rubber mallet are used to position weatherstripping around rear window glass.



In some respects, the operation resembled a huge game of chess. Over a weekend, crews of workmen would move entire departments to make space for new installations. Then, as another crew installed new facilities, another department was moved and its former area cleared for other purposes. One might think that every move on the board was an "en passant" in process, but with no pawns lost in the moves. Efficient plant engineering made every move "check," but never "check mate" at any time.

One department was moved, according to plan and without losing an hour of production time, four times in 21 months.

A total of 926 individual drawings of new equipment and installations was prepared by plant engineers. This does not include the thousands of detailed drawings prepared by the 44 different firms of contractors who were employed. All the drawings and specifications prepared would fill a two-car garage.

Moving the body-building operation from the Mack Avenue Plant to Plymouth Assembly and taking the six-cylinder engine machine shop from Plymouth to Trenton Engine was a major liaison and materiels program. Engines had to be stockpiled and operations precisely coordinated to avoid bottlenecks or shortages.

The machine shop was moved over a six months period. It involved the transfer of 1,168 machines varying in weight from 1,200 to 88,000 pounds. The move was made mainly by railroad, and since the loading docks were needed for the arrival of materials for current production during the day, it was accomplished mainly at night. During the peak period of the move, eight flatcars were loaded each night with equipment for transfer to Trenton.

A dozen trucks were loaded with scrap metal. A semitruck loaded with new bodies would arrive and

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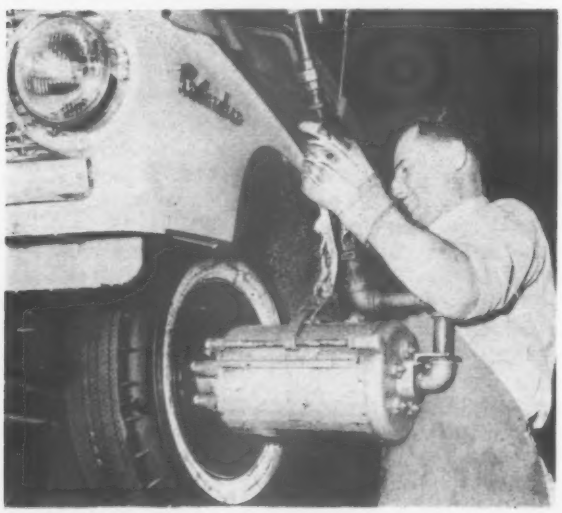
The Plymouth body is assembled by stub frame bolts in an operation receiving 100% inspection.

An air impact tool tightens front engine mounts to the frame. Torque specs are 55 to 95 ft-lbs.



Torque of 50 to 80 ft.-lbs. is required in running wheel lugs.

unload every eight minutes. A mixer truck carrying mixed concrete for new floors arrived every seven minutes. Trucks carrying the broken remnants of old concrete floors were departing as rapidly as they could be loaded. At one point, a load of about 400 yards of concrete was arriving and being poured for new floors.

Now that the plant is completed, one finds similar coordination and control continuing into assembly line activities. One of the most important quality control features of the assembly operation is to have quality inspections at strategic points as the car is being built. Cars leave conveyors midway through the assembly process to receive their mechanical check-out. In this way, the engine, transmission and all parts which make the car move are proved before the rest of the car is built. This permits easier checking and adjustments.

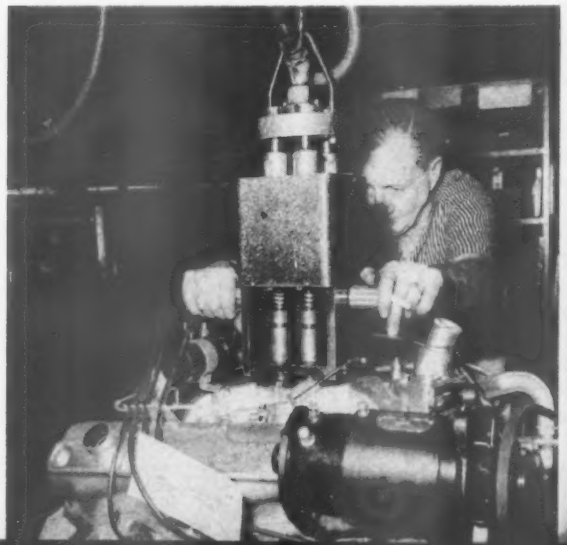
Forty-five separate weatherproofing operations are performed in the manufacturing process. Almost 200 pounds of rubber, tar, cement, plastics, paint and a variety of other weather-resistant materials are used to protect each car against the elements. Vibradamp, a tar-like material, gets the greatest usage. Sealer is applied to seams prior to welding. Sealer also is used when cementing glass to rubber.

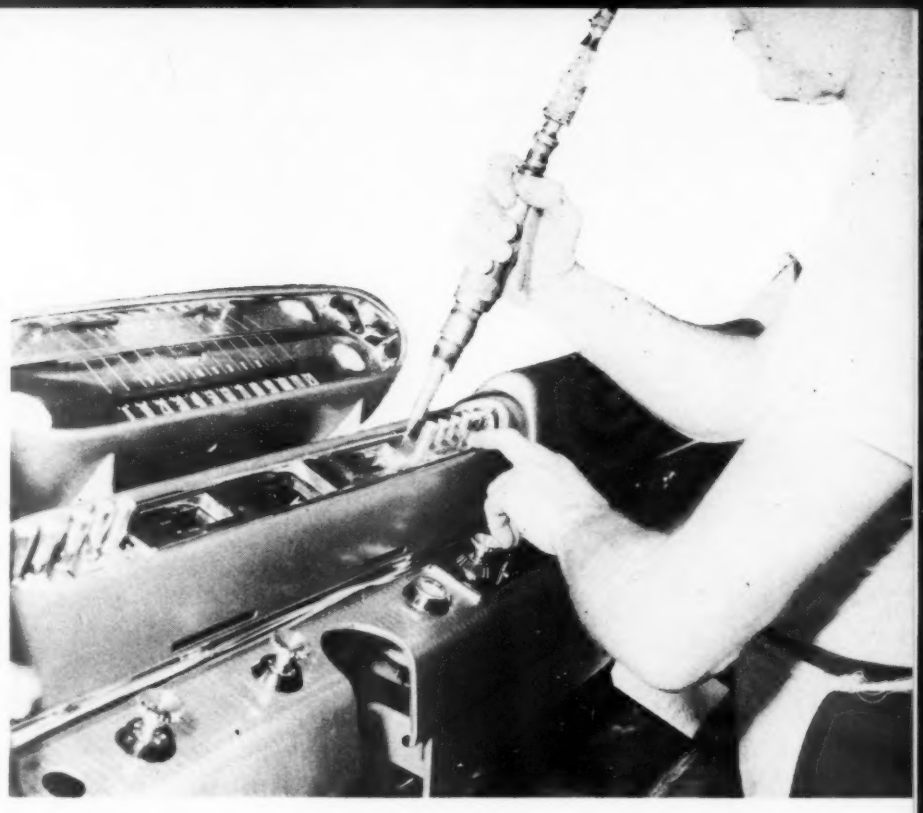
Every car coming off the line is subjected to a hurricane force water test in which 280 gallons of water per minute under 30 psi pressure search for possible leaks for four minutes.

Plymouth's quality control department operates independently of manufacturing and assembly. In effect, each inspector critically checks every automobile as if he were the customer to buy that car.

There are seventeen inspection stations located at key points along the line where 210 quality control inspectors check over every car. Five of the seventeen stations are called master stations. It is at these five points that the inspectors are called "buy-off" inspectors. They go over the entire car as assembled up to that point and either "buy" or

A multi-studsetter with 5/16-24 thread jaws assembles the carburetor mounting studs to intake manifold.





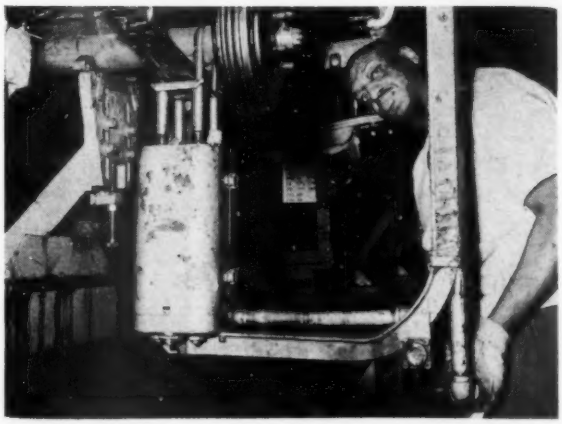
Right top: Three No. 6 screws and an air screwdriver with magnetic bit are used to install the bezel, for fresh air control on push button heater, on the instrument panel. Torque is 8 in.-lbs., plus or minus 2 in.-lbs.

Right middle: Rear spring plate nuts are tightened (50-90 ft.-lbs.) by a multiple-spindle nutrunner with C-hook rails.

Right bottom: In assembling the name letter to the hood, an air nutrunner is equipped with 45° angle driver with ¼ adaptor and magnetic socket to retain the nut.

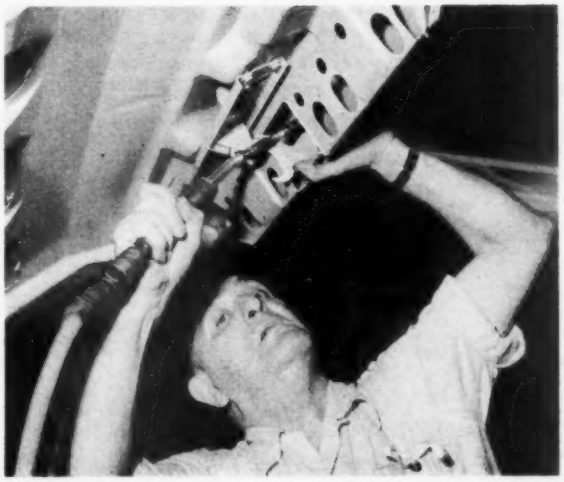
"don't buy." If they don't buy, the car goes back into the line for complete rework. Otherwise, it continues down the line.

The first "buy-off" is at the end of the body-in-white. At the second, the paint write-up is prepared and travel tickets are attached to each car. These travel tickets contain all inspection notifications and corrections. The third "buy-off" is where the underbody, hardware, motor and chassis are checked. The fourth is the functional roll test to check engine, transmission, rear axle, the lighting system, and all other moving parts.



It was intriguing to see this operation where, for the first time in the car's life, the engine was started and the unit rolled under its own power. Ultimate efficiency of engine assembly must be assumed when one sees that the continuous flow of the assembly line depends on each and every engine's ability to start at the right moment and drive the car off the conveyor.

The final "buy-off" point is the inspection at the special conditioning line where corrected work has been done. If all inspectors buy the car, it is ready for shipment.



Quality control boards are placed in view for all employees at 26 points throughout the assembly line. These charts are updated every two hours by a sampling of twenty cars picked at random out of the line. This sampling is taken four times during each regular working shift. At the end of each day, a daily rating sheet is given to each foreman showing quality of every component and the automobile as a whole.

The quality engineering section develops the

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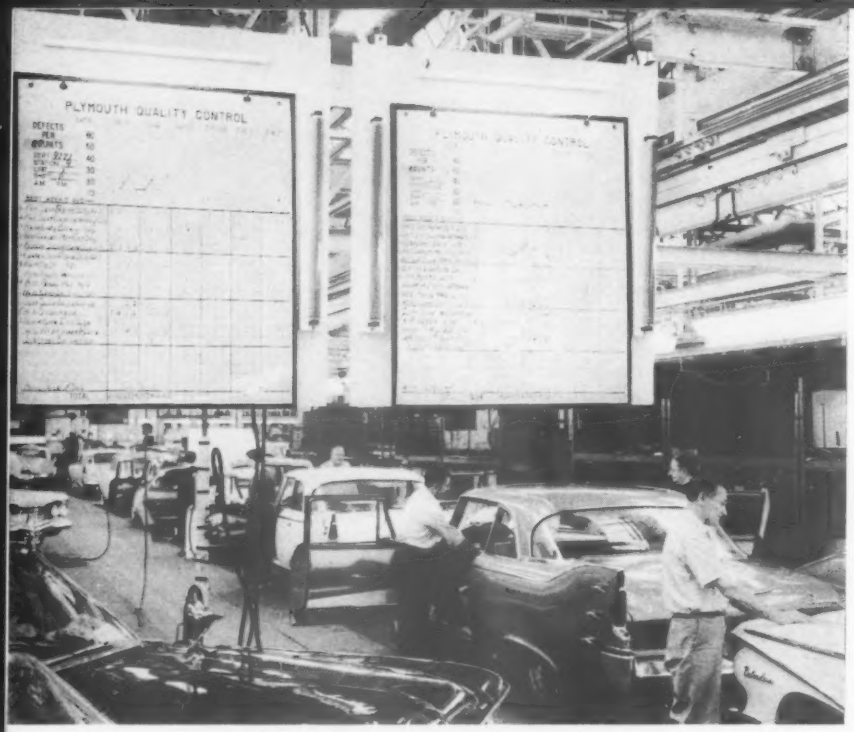


Charts for each shift indicate the effectiveness of quality control efforts.

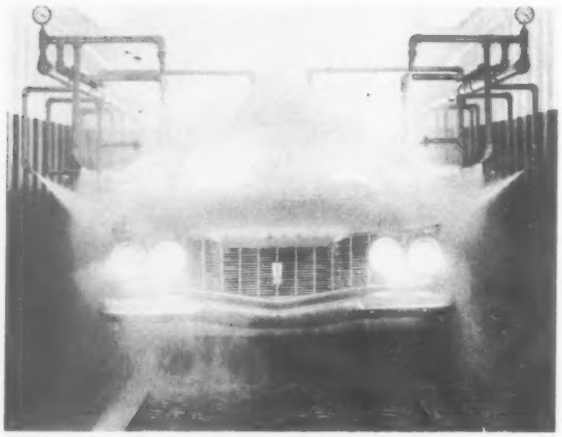
Plymouth Assembly, continued

methods, frequencies and charts by which the inspection section performs its job. Quality engineering can also recommend design changes.

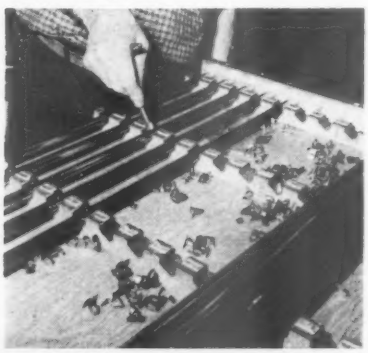
Every member of the Plymouth manufacturing team, from the top executives down to the stock chaser, is encouraged to think that a quality product or service depends entirely upon him. So, it is no concession to recognize that Plymouth has gone all out to prove and continue what has been claimed—the best built Plymouth car in its 31-year history.

Meanwhile, for those of us who might sense any anxiety that welded body construction may diminish the significance of fasteners and traditional assembly techniques, Plymouth shines a very bright spotlight on the many fasteners it uses. They only force the issue we have been singing about all the time. In a unibody car, functional units and the fasteners which hold them together had better be of excellent quality, assembled to give reliable operation.

Every car moving down the final assembly line is given a hurricane-force water test to search out points not completely sealed.

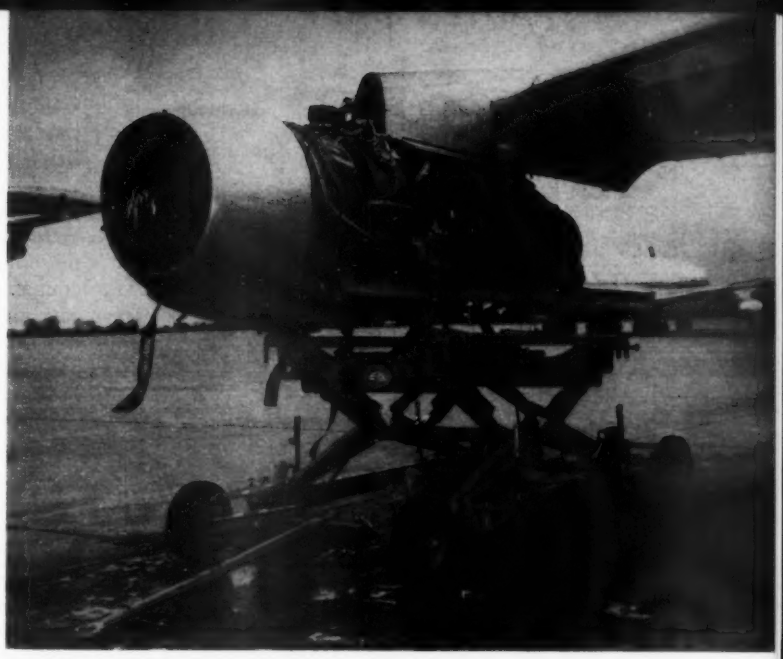


Spring clips fasten finish moulding to instrument panel.



Three "O.K." lines absorb the 56 cars per hour that come off the final assembly line. All cars receive finishing touches before shipment.

HOW AIR LOGISTICS SELECTS FASTENING METHODS



Joint failure on this jet engine trailer could be disastrous.

by **David L. Buckley**
Project Engineer
Air Logistics Corporation
Pasadena, California

Efficiency and cost: How one company deals with these fastening factors at the product design level.

It would be presumptious for any engineer to state flatly that certain types of fasteners should be used in certain types of joints. First, because any fastener or fastening method is an integral part of the product design in which it is used and must be compatible with that product. Secondly, because the variety of fasteners and fastening methods available today usually allows a latitude of choice after joint requirements have been established. When it is discovered that several types of fasteners or fastening methods can be used to secure a joint, then it is logical to choose the most economical method if it can be accomplished with available shop tooling and personnel.

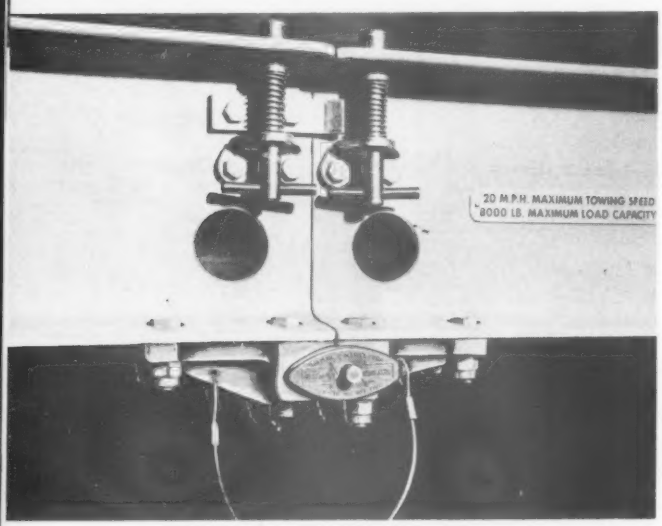
Here at Air Logistics, where we manufacture ground support and handling systems for aircraft, missiles and other space vehicles, our fastening problems are particularly complex due to specific product requirements. Our products are used in all parts of the world and under every conceivable climatic condition. This makes joint weathering and corrosive tendencies a problem. Many of our products are transported by air, so weight must be considered. Interchangeable fixtures are used on much of the handling equipment to adapt it to various handling jobs; so efficient, fool-proof, quick-disconnect and attachment devices are necessary. In products intended for military use, rigid pre-established specifications must be met.

In conjunction with the above, we are faced with the fastening problems normal to any commercial product. These include comparative costs of the different fastening techniques that can be employed in a given situation, availability of shop equipment to perform specific fastening operations, personnel skill requirements, and the ability of our subcontractors to install the fasteners or employ the fastening techniques we specify.

When we design a new product at Air Logistics,

continued

Joint corrosion is a major problem with field handling trucks which are in use worldwide.



A quick-disconnect pin (lower center) fastens the frame rails of a handling trailer which is adjustable in length.

A container of reinforced plastics is bonded together.

fastening techniques are usually not brought into the picture until the design concepts have been firmly established. Then, with this design concept to work from, we are able to establish where all joints will be, and whether each joint in turn will be permanent, a breakdown point in assembly, a disconnect point during part replacement, or a disconnect point during maintenance and repair. We can also determine where quick-disconnect joints must be installed to simplify modification of our handling equipment during normal field service.

Sometimes, during these preliminary studies regarding fastening techniques, the design concept itself may be slightly altered to permit a different type of joint, or to eliminate a joint by preforming a certain part prior to assembly. Sometimes the pre-forming operation will be far less costly than the fastening techniques used to join two or more components together to produce the same part. This is particularly true when plastic parts are involved. Or again, the faying surface of a joint may be slightly expanded so that metal bonding can be used for fastening. This applies generally to joints where plastics must be fastened to metals.

After each joint has been definitely located, the nature of its permanency is determined (whether or not it must be a disconnect point), and stress requirements are established. Then and only then do we regard each joint as a problem in itself and determine how best to fasten it. In doing this, we work within the perimeters established by the above information.

Fusion welding is often a most economical method of joining ferrous metal parts together. But certain considerations must be given this process. If the joint must be disconnected at any time during the life of the product, fusion welding is automatically disregarded. We also remember that fusion welding almost always causes some distortion. Thus in the fabrication of small parts and sub-assemblies which include machine joints for final assembly, the distortion induced by fusion welding during part or sub-assembly fabrication may affect the tolerance requirements of the machined joints. This is less of a problem on large sub-assemblies where, during part fabrication, the welding is accomplished some distance from the machined joints.

If the ferrous metal joints cannot be fastened by fusion welding, bolting is the next logical consideration. Bolting provides a disconnect point, and can be accomplished with relatively simple shop equipment. The most important engineering factors in a bolted joint are bolt hole location and bolt hole size tolerance. Accurate hole location is necessary for interchangeability of parts. Assembly line bolt hole drilling should be avoided whenever possible to avoid mis-location. Gang drilling of bolt holes in a drill (tooled with fixtures for holding the part during drilling) is the best way of assuring part interchangeability with matching holes. Bolt hole tolerance is also important because a loose fit not only allows misalignment during assembly, but fails to exhibit maximum strength.

Because of the severely corrosive conditions under which Air Logistics handling equipment must be used, all bolts are cadmium plated whether or not they will be used in dissimilar metal joining.

In sheet metal assemblies, we regard the question of whether to spot or seam weld as one of strength requirements. Because of the continuous nature of a seam weld, it is stronger than individual spot welds, and seam welding should be used where maximum strength is necessary.

Fastening metals to reinforced plastics is becoming more and more of a problem. We have found that bonding is the most effective method for fastening plastics to metals. But, because of the tendency of a bonded joint to laminate and peel when subjected to stress, we usually include spot bolting to improve joint strength. The bolts prevent the initial distortion of a joint which might cause the bonding adhesive to start peeling.

It is not practical to buck a rivet against most plastics because the impact stresses are usually harmful. Therefore, in a well engineered joint between metals and plastics, the rivet must be sheathed with a metal bushing which transmits the stresses imparted by the rivet upsetting tool. This prevents injury to the plastic.

We have found it most economical to eliminate as many joints as is possible in plastic parts by pre-forming a homogeneous part to shape, rather than by fabricating it by joining several components together. This eliminates joint problems except where the finished part is finally assembled to other materials.

As already noted, Air Logistics handling equipment for removing and installing power plant equipment in airplanes and missiles must be frequently field-modified with fixtures for handling power plants of different sizes and shapes. These fixtures are usually attached to the handling equipment using quick-disconnect pins so that fixture change can be accomplished with a minimum of effort. In fact, we believe that pinned joints should be considered whenever it becomes necessary to frequently break a joint. Pinning requires only careful hole drilling in initial production. Installing the pins on the line requires a minimum of time.

While brazing is an ideal joining technique for many product components, in our particular case it is not frequently applicable.

From the economic standpoint, selecting the proper fastener implies more than merely engineering an efficient joint. Shop equipment and personnel skills required, both on the part of the prime manufacturer and his various subcontractors, must be taken into consideration. Because of this, it is necessary to standardize on certain fasteners and fastening techniques. This is of prime importance in smaller companies where shop tooling is limited when compared to the big airplants and automobile factories. It is unwise to specify a certain fastener or fastening technique which calls for special tooling unless there is evidence that the same fasteners or fastening techniques will be employed many times.

Metal stitching requires a special machine; very thin gauge butt welding requires a special automatic welder and weld peening equipment; bonding calls

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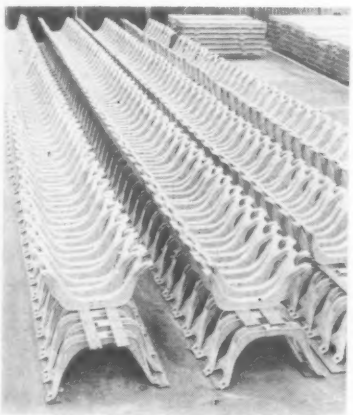
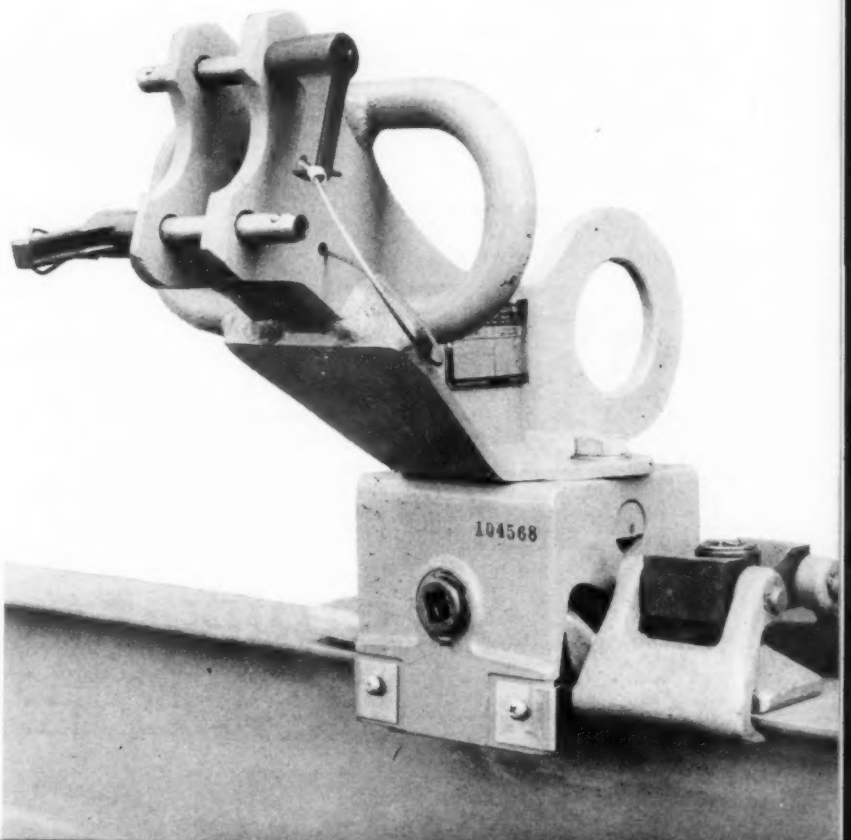


It was more practical to pre-form the components of these trailer frame brackets than to produce a complex, built-up part.

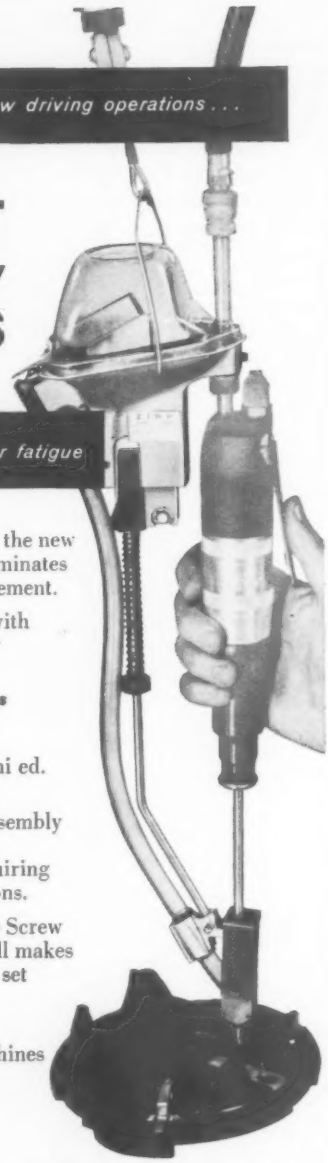


How many different fastening methods can you find on this fixture for attaching jet engines to a trailer? The parts are cadmium plated to check dissimilar-metals corrosion.

new . . . low cost . . . for all vertical screw driving operations . . .

STRIPPIT
ZIPP SCREW
FEEDERS

save time . . . cut costs . . . reduce worker fatigue



save 2 to 25 seconds per piece per station — the new Strippit Zipp Screw Feeder completely eliminates production time lost in manual screw placement.

reduce errors and rejects — worker fatigue with its resulting loss of production efficiency is cut to an absolute minimum.

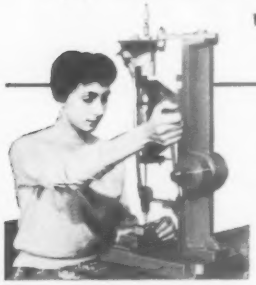
automatically feeds and drives all type screws — will feed and drive slotted, socket, clutch, hex or Phillips head screws even where clearances are extremely limi ed.

high efficiency, long run production — these units are particularly effective for the assembly of appliances, electronic and electrical components — and any application requiring continuous vertical screw driving operations.

for all makes of air and electric tools — Zipp Screw Feeders are designed to fit perfectly on all makes of power screw drivers. They are factory set to fit your present or new equipment.

precision built for accurate operation — the screw holding collets of these machines are precision machined to hold screws accurately and firmly for finding screw holes. There are no delicate mechanisms to get out of order.

low cost, high speed, ease of operation — all contribute to production line economies that enable Strippit Zipp Screw Feeders to pay for themselves in from 30 to 120 days.



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for ovens or autoclaves. Specifying any of these fastening methods for one-time usage, and when the shop equipment is not available, is not practical. When new equipment is purchased to accomplish specific fastening jobs, it should be possible to amortize the cost of the equipment over many future fastening jobs.

The multitude of fastening devices and fastening techniques available today makes it impossible to point a finger at any one of them and say which one should be used in specific applications. As we have pointed out, too many factors over and beyond the actual fastening operation are involved. But this does not mean that the fasteners or fastening method to employ cannot be determined before production starts. While some changes may be indicated during actual first product or prototype assembly, these can be held to a minimum by careful planning.

To summarize then, how we select the proper fastening method for Air Logistics products, here is an outline of our program:

A. The design concept is first firmly established, with all breakdown points and joints located, and stress requirements analyzed. The number of products to be produced is pre-determined as nearly as possible in an effort to control costs.

B. Each joint is given individual study as to the various fasteners or fastening methods which will secure the desired results.

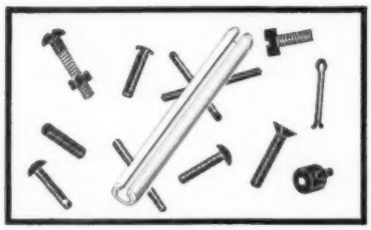
C. These methods of joining are sorted as to overall cost and the most economical fastening method of the lot is chosen.

Note that throughout the process of selecting proper fasteners, we emphasize costs. Costs can become prohibitive when certain types of fasteners or fastening techniques are specified. Fortunately, the number of fastening techniques available today makes it quite simple to select an economical method of fastening, but only after all engineering and technical requirements for fastening are firmly in mind. •

How can this simple fastener cut the cost of your product?

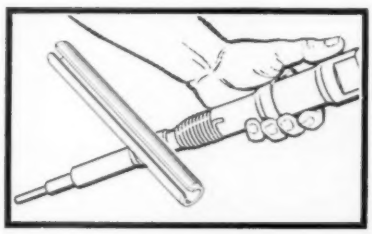
Rollpin aids standardization and reduces inventory

Rollpin readily replaces taper pins, grooved pins, straight pins and set screws; it can be used as a locating dowel, hinge pin, cotter pin, stop pin or, in some applications, even as a rivet. Thus, when you standardize on a Rollpin you can drastically reduce the variety of fasteners in your inventory—save money in purchasing, storage space and stock handling.



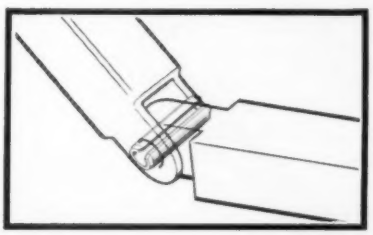
Rollpin simplifies production processing . . . saves man-hours

When you use Rollpin you can eliminate costly precision drilling, or tapping operations. And there's no need for any secondary locking operation—such as lock wiring or peening. That's because Rollpin is a slotted tubular steel spring whose chamfered ends drive easily into standard production-drilled holes, compressing as driven. The spring tension against the hole walls retains Rollpins securely against severe vibration. Independent studies have shown that installed costs of Rollpin are as much as *91% less* than those for a dowel pin or *95% less* than the installed cost of a taper pin.



Rollpin simplifies product maintenance

Only a drift pin or standard punch is required to remove a Rollpin. The slotted tubular shape and the spring action principle do not damage hole walls or enlarge the original hole diameter. Consequently the same pin is easily re-inserted and can be used again and again. Mail our coupon today for the complete Rollpin story.



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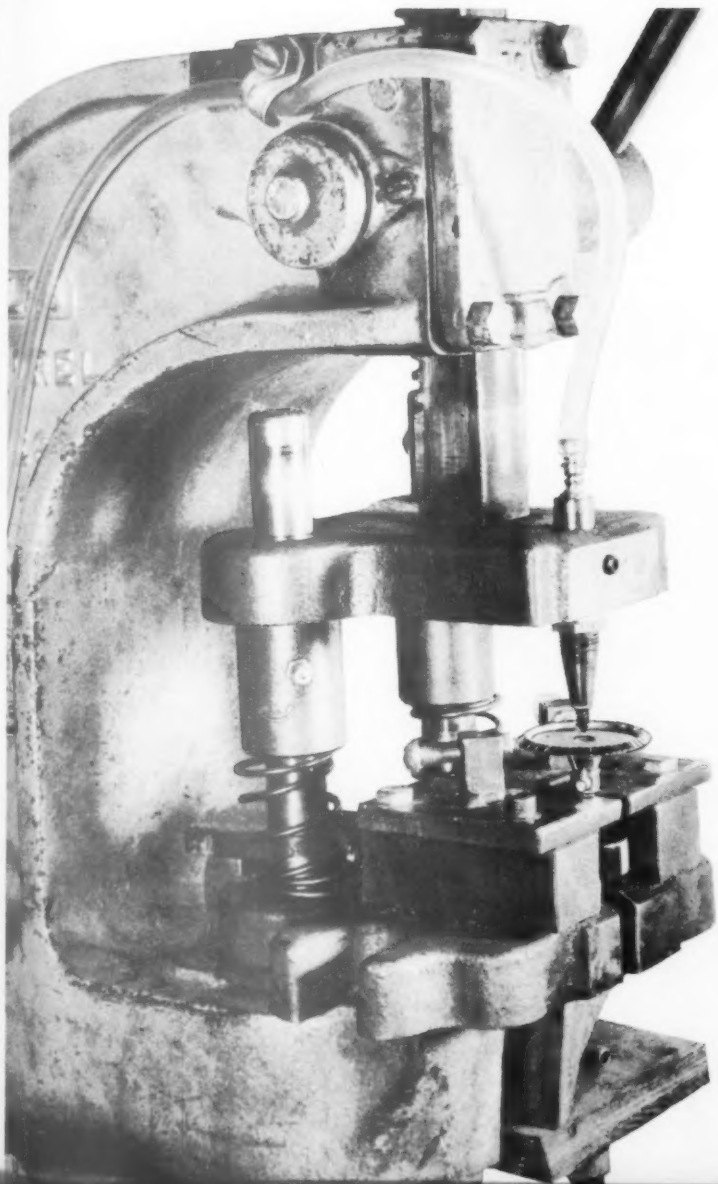
Four intricate fastening operations at DeVilbiss point out the economies possible in well-designed assembly fixtures.

PRESS FITTING SMALL PARTS

by **Robert C. Vincent**
Plant Superintendent
The DeVilbiss Company
Somerset, Pennsylvania.



Atomizers and vaporizers of different designs are produced in runs up to 75,000, in the Somerset (Pa.) plant of The DeVilbiss Company. Here most of the metal and some plastic parts are fabricated and assembled. In assembly, the setups described here could be applied in other forms for similar work. For us they have promoted speed and economy, besides contributing to quality by doing better work with fewer rejects.

While perfume atomizers, especially, are equipped with flexible bulbs to produce a spray, various others use a small pump plunger that is depressed by finger action against a return spring. Figure 1 shows the atomizing head of one such unit in the fixture of an arbor press used to apply a small drive screw that fastens a finger button to the atomizing head.

This screw has a hemispherical head without any slot and must

continued

Fig. 1: In this press setup, a screw is driven into the spray head of an atomizer. Suction through a flexible tube holds the screw head in place while permitting it to turn when the punch forces it into the work.

be held by an inserting punch whose recessed end fits the head. A magnetic punch was tried but proved unsatisfactory. Now, a punch, having an axial hole and connected at the top to a flexible hose extending to a small vacuum pump, is used with considerable advantage. Suction holds the screw securely but permits it to turn as its threads are forced into the work piece. About 500 screws an hour can be driven in this setup.

Small cylinders for atomizer plungers extend well below the screw cap that fastens the assembly to the jar or bottle of the perfume container. A .104" hole is drilled and beveled at the center of the cylinder head and then tapped to produce a 4-40 thread. This thread is used to fasten a flexible polyethylene plastic tube which extends close to the bottom of the container. No thread is cut on the flexible tube until it is rotated and driven into the tapped hole that forms the mating thread. The tube o.d. has the same o.d. as that of a screw that would fit the tapped hole.

The flexible tube is inserted in a close-fitting blind hole in a brass chuck on the shaft of a small air motor, as in Figure 2. The operator presses the tapped end of the cylindrical assembly against the outer end of the tube. The motor is started and the tube turns slowly. Driven only by friction in the chuck hole, the tube is screwed into the tapped hole.

One type of vaporizer makes use of a plastic flanged cover to which two plated stamped steel electrodes of channel section have to be fastened. These electrodes extend downward into a jar for a water solution that is evaporated slowly when current is passed through the solution from one electrode to the other. Each electrode is fastened to the molding by applying square brass nuts that fit the threaded ends of brass terminal pins.

These pins extend through a wall of the molding that is vertical when in use but is placed horizontally when the fastening is made in the setup shown in Figure 3. Each pin has a hex flange that bears against the lower face of the wall and fits a socket in a vertical driver below the table on which the assembly is made. Threaded ends of the pins pass through the wall. When assembled, they also pass through the channel flanges of the electrodes and through the square nuts that are placed between these flanges.

To make the assembly, the operator first sets the two pins in the driver sockets. He then places the molding so that the threaded ends come through the two holes in the molding wall. Electrodes and nuts then are put in place in the table fixture, with holes in line with the pins to be driven.

One side of each nut is in contact with the channel web and thus cannot turn. The operator moves a treadle (one for each driver). The drivers, actuated in succession, turn the pins until they feed through the nuts and clamp the lower electrode flanges against the molding wall and between the nuts and pin flanges. The latter are seated against the lower face of the wall.

Drivers have clutches that slip when the pre-set torque is applied, hence no damage can result from excessive tightening. If either electrode should be bent or displaced when tightened, it can be pressed back by the

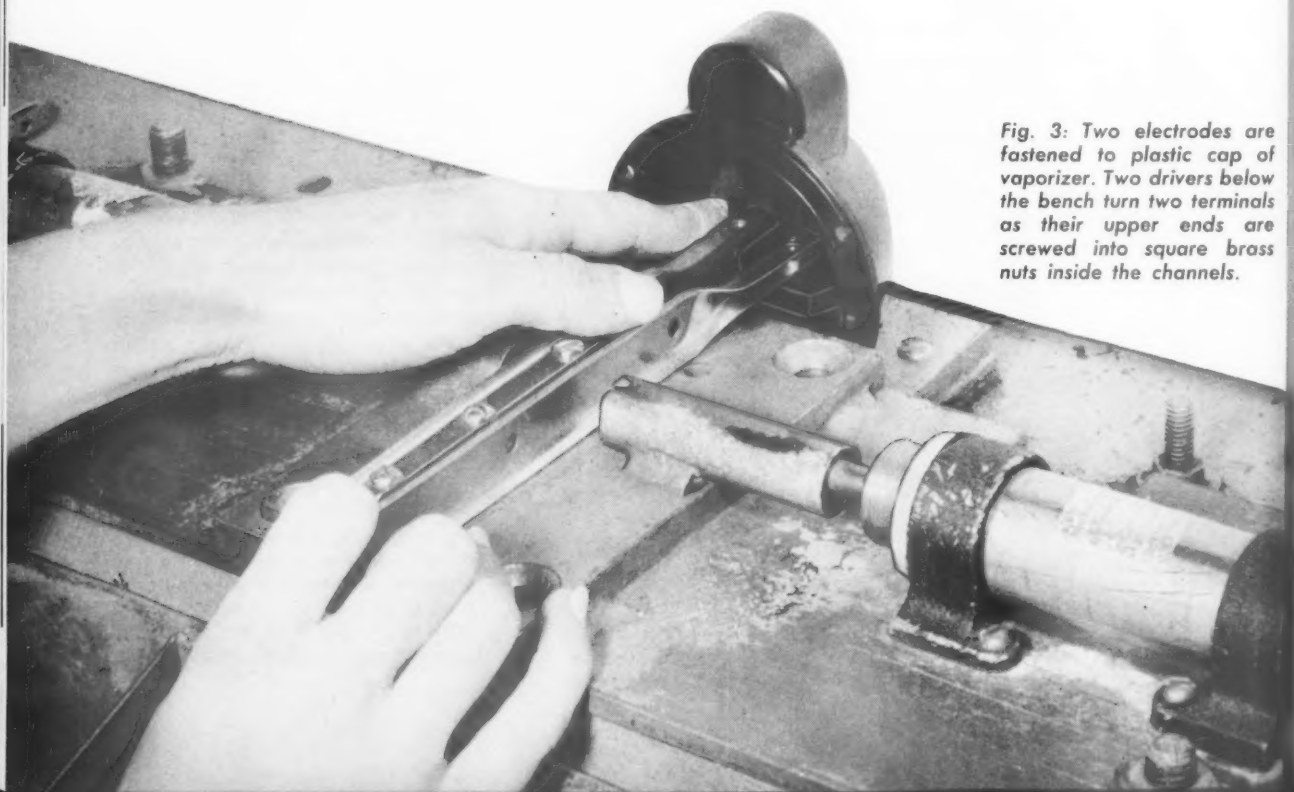


Fig. 3: Two electrodes are fastened to plastic cap of vaporizer. Two drivers below the bench turn two terminals as their upper ends are screwed into square brass nuts inside the channels.

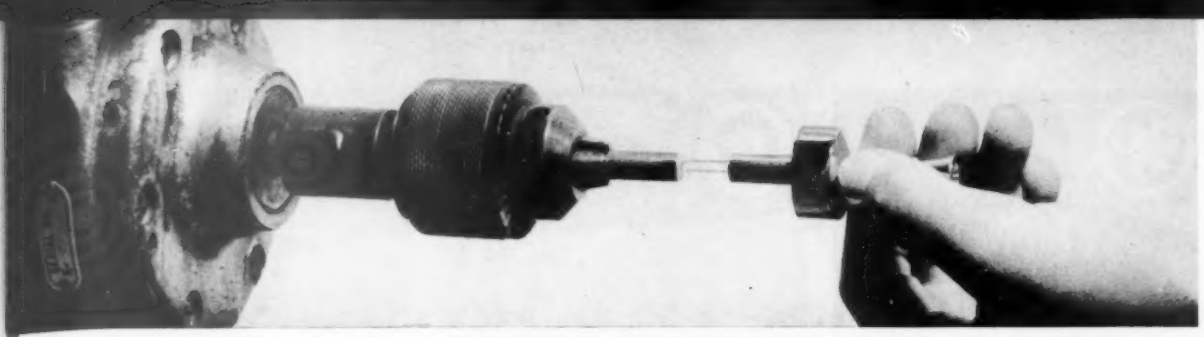


Fig. 2: The unthreaded outer end of a flexible pastic tube is forced into a trapped hole in the head of an atomizer's cylinder assembly. The brass chuck with a blind hole is turned slowly by an air motor.

plungers of air cylinders at each side of the fixture. This is seldom required.

With this setup, an experienced operator can complete about 250 assemblies an hour. It is significant that the operator has both hands free and safely away from the drivers.

In one atomizer design, two brass tubes 3¾" long have to be assembled. Each is passed through one of two parallel holes in a short length cut from an extruded brass bar having a section resembling a figure 8. These tubes are bent to flare apart slightly near the fastening. Then their outer ends are bent and machined with bosses that bear against each other when the assembly is made. Subsequently, the tubes act as springs that press the bosses against a small nozzle that can swivel about a hole in which the bosses fit.

Assembly of the two tubes to the extrusion is done in a dial fixture, Figure 4. This operation has to be performed so that the bosses come together and all bends are in one horizontal plane. At the front or loading station, two tubes are loaded by hand with the bosses at the bent inner ends bearing against each other. The outer ends are parallel and in line with the holes in an extrusion (also placed by hand). Fingers then are used to push the extrusion over the outer ends of the tubes.

This motion also closes a switch that actuates units at subsequent stations and also causes the dial fixture to index a few seconds later. When the partial assembly, started at the first station, reaches the second station, an air-operated slide is advanced radially inward. The extrusion is pushed to its final position near the center of the two tubes.

After the next 90° indexing, the extrusion comes under a two-pointed punch that, when air operated, stakes the extrusion to each tube. At the final station, a taper punch is inserted between the two tubes, springing them apart temporarily, so that the assembly clings to the punch and is lifted out of the fixture as the punch retracts. When the punch nears the end of its upward stroke, the assembly is stripped off, falls into a chute feeding into a tote box. The empty fixture indexes back for re-loading.

Subsequently, the tube assembly goes to a setup where the inner straight ends of the two tubes are pressed into mating holes in a domed brass cap whose female thread fits the top of a bottle. Bent ends of the tube are then spread apart so that the two bosses can enter the ends of a cross hole in a spray nozzle. When the spreader is removed, the bosses enter the hole. The shoulder at the end of each boss is pressed against the flat sides of the nozzle by the spring action of the tubes. This makes tight joints but permits the nozzle to swivel so that it can be set at any desired angle. •

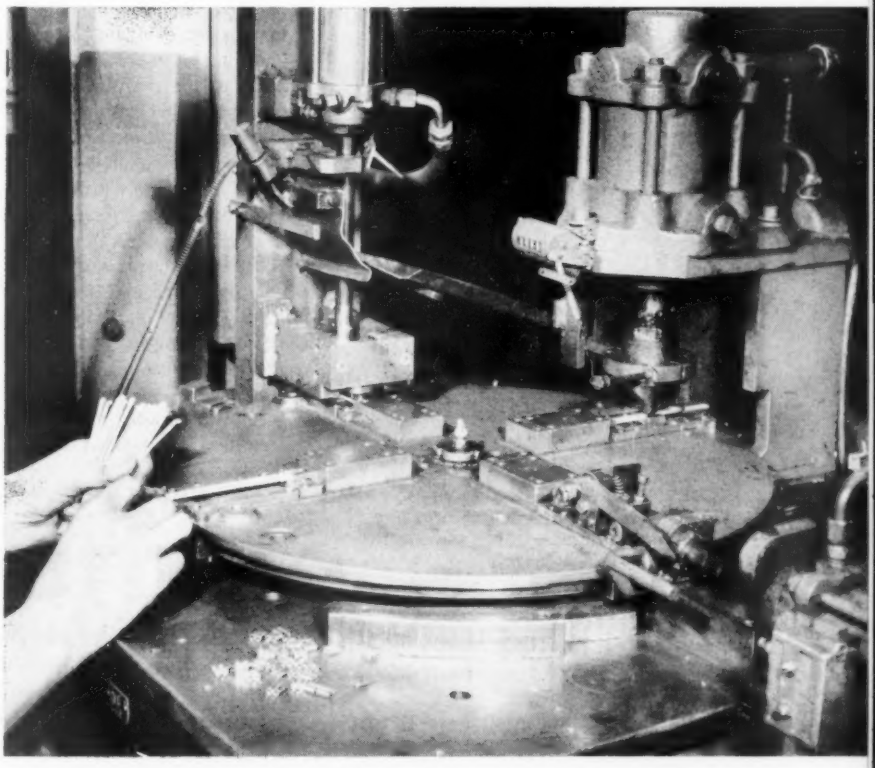
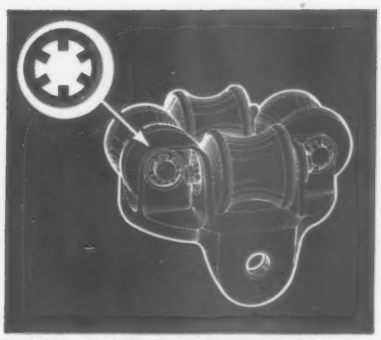
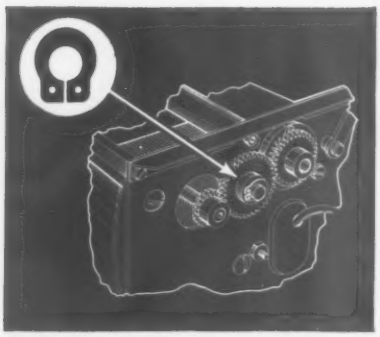


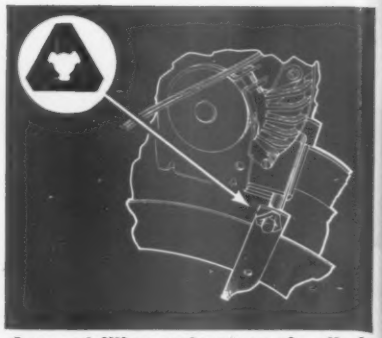
Fig. 4: This fixture, indexing through 4 stations, assembles two tubes and an extrusion. The extrusion is staked at the final station. Manual loading is done only at the first station, other operations, including unloading, being automatic.



Drilling and flaring eliminated. Easier maintenance, a time saving of 50% and elimination of costly, time consuming drilling and flaring operations result when Truarc Series 5115 self-locking rings are used to retain rollers on pins in this electric cable guide. Extra long prongs enable ring to accommodate wide shaft tolerances.

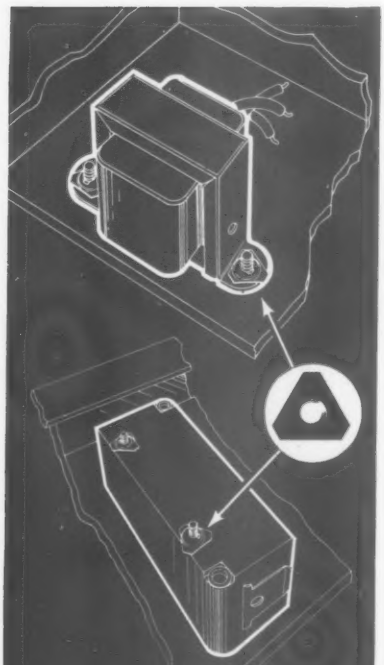


Economical fastening for idler gear. Installing Truarc Series 5555 Grip Ring flush with hub insures precise seating of gear in this portable electrocardiograph assembly. What's more, the ring eliminates a nut and costly stud-threading operation of alternate design. **Typical savings amount to $365 per 1000 units.**



Cross-drilling and cotter pin eliminated. Here a Truarc Series 5305 self-locking triangular retainer replaces a cotter pin used to hold an electric-motor mounting bar. Both the cotter pin and the cross-drilling operation required in the original design are eliminated. **Typical total savings amount to $120 per 1000 units.**

Truarc self-locking retaining rings boost economy in wide variety of designs



Easy way to mount electrical-electronic parts. Truarc Series 5300 triangular nuts replace conventional nuts and lockwashers in mounting electrical parts like transformer (top) or Microswitch (bottom). Dished body of Series 5300 flattens under torque, eliminates need for lockwasher, simplifies handling and assures assembly.

...eliminate parts, machining, speed assembly

Easy application, elimination of more expensive conventional fasteners and reduction or elimination of machining operations are just a few of the savings resulting from the proper use of self-locking retaining rings. Rings replace threaded retainers and nuts, hairpin-type cotter pins, and a variety of cut, lock, and plain washers. They require no groove, or preparatory machining operations. Rings can be installed by unskilled labor, seated at any point on the shaft, automatically taking up any accumulated tolerances.

Four ring types are shown. One has a dished triangular body which locks the fastener on the shaft under spring tension, holds under moderate shaft tolerances and against extremely heavy thrust loads. Another, a re-usable Grip Ring, is ideal for ungrooved shafts, tubes, bosses, and studs. A third type is a triangular free-spinning nut with a dished body that flattens under torque, eliminating need for separate lock washers. The fourth, a push-on type, has an arched rim to provide high strength and extra long locking prongs which accommodate wide shaft tolerances.

These are but four of the 50 functionally different types of Truarc retaining rings. They come in 740 standard sizes, 6 metal specifications, 13 different finishes. The entire Truarc line, including assembly tools, grooving tools, and 80 typical cost-saving applications, is covered in the new catalog RR 10-58. And remember, Waldes engineers are always ready to help you solve your application problems—whether they involve one of the standard Truarc rings or a "special" to fit your particular requirements. Waldes Kohinoor, Inc., 47-16 Austel Place, Long Island City 1, N. Y. D.15

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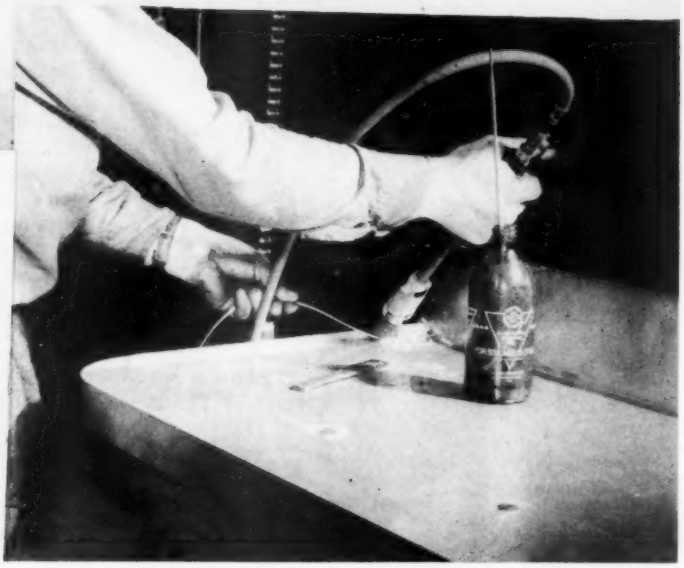

At the Mosler Safe Co., Hamilton, Ohio, this stainless steel ceiling for a bank drive-in unit is first fluxed (left). Then soldering is done with an air acetylene torch soldering iron with 70 30 solder (bottom). Afterwards the joint is brushed with cold, clean water to prevent corrosive attack.

For Hermetically Sealed Joints Try . . .

SOFT SOLDERING STAINLESS STEEL

by **W. E. McFee,** Supervisor
Product Information Service
Armco Steel Corporation

All stainless steels can be soft soldered to produce tight or hermetically sealed joints. Proper soldering methods will approximate the strength of the solder alone. Soft solders are relatively weak alloys with tensile strengths ranging from only 2,000 to 7,000 psi as against 70,000 to 200,000 psi, or more, for stainless steels.

This means that where both a tight seal and strength are necessary in a joint, the edges to be joined should be lock-seamed, spot-welded or riveted for strength; then soldered to seal the seam. Where joints of maximum strength and tightness are required, welding is recommended.

For a strong joint with tightly adhering solder, the joint surface must be thoroughly cleaned of such substances as heavy grease or drawing compound and roughened to insure good adhesion. Sheets having a pickled finish are sufficiently rough and need only to be cleaned before applying the flux. Sheets having a smooth cold rolled finish, such as No. 2B, or sheets with polished finishes, such as No. 4 finish or higher, should be roughened or etched before soldering. They may be roughened by filing; rubbing with emery cloth; grinding with a wheel, or etching with commercial hydrochloric acid. The acid requires but a few minutes to etch and should be thoroughly cleaned from the metal after use.

For smooth, strong joints, a solder containing 70% tin and 30% lead is recommended. This solder produces bright, strong joints with good corrosion resistance. Also its lower melting point results in less discoloration of adjacent metal.

If the 70-30 solder is not available, other analyses may be used. In general, soft solders should not contain less than 50% tin as fluidity and wetting properties are reduced with lowered tin content. Moreover, solders low in tin darken more readily on exposure to the atmosphere.

For proper adhesion of solder, fluxes must be stronger than those used on mild steel, since they

continued

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Soldering Stainless Steel, continued

must cut through the oxide surface film and etch the metal beneath. There are a number of excellent commercial fluxes for stainless steel. Good results may be obtained by the use of 85% orthophosphoric acid.

Place the piece to be soldered in a position that will lend itself to a speedy soldering operation. Generally, a flat or horizontal position is most suitable. Brush on the soldering flux, preferably with a small brush, to prevent spreading beyond the surface to be soldered.

Before soldering it is advisable to "tin" or coat the edges to be joined with a thin film of solder. This will cause the solder to flow more smoothly and produce better penetration. Where many articles are to be etched at one time and later soldered, tinning will keep the joints clean.

Apply the solder in the usual way, using a large hot iron, quickly flowing the solder into the joint. Since stainless steel conducts heat slowly, it requires a longer time to heat the joint to the soldering temperatures than when soldering steel, brass, copper and other metals. Although longer application of heat is necessary, higher temperatures are not required and should not be employed. The temperature should be only high enough to melt and flow the solder.

Immediately after soldering, thoroughly wash the joint and any other area on which the flux may have spilled. Use a soft scrub brush vigorously and plenty of running water. Neutralizing is unnecessary when the acid is washed off. Moreover, neutralizing without washing will not remove the corrosive acid salts.

Sweat soldering is a form of soft soldering used to produce water-tightness in lock seam joints. The same solders and fluxes used for soft soldering are also suitable for sweat soldering.

Flux both joint surfaces, tin and then lock-seam. Sweat or seal the joint with a hot soldering iron or blow torch. After soldering, neutralize and wash the joint as recommended for soft soldering. ●

"Mr. Haskel should learn how to turn down salesmen with a little more tact."

RBW FASTENER BRIEFS

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

Technical-ities

By Fred E. Graves

Why cap screws instead of studs?

Many types of products once fastened with studs are today assembled with cap screws. Why the change in preference?

Studs show certain advantages in large diameters and in high temperature applications. But when it comes to smaller sizes used in tapped holes, designers and production people have found more advantages in cap screws.

ASSEMBLY FACTORS

In fastener selection for a given application, you have to consider production and assembly as well as joint strength.

Obviously, studs require two wrenchings (first stud, then nut). Also, there's a more expensive close tolerance tapping job, since a stud takes an interference fit to stay tight and not withdraw when nut is backed off.

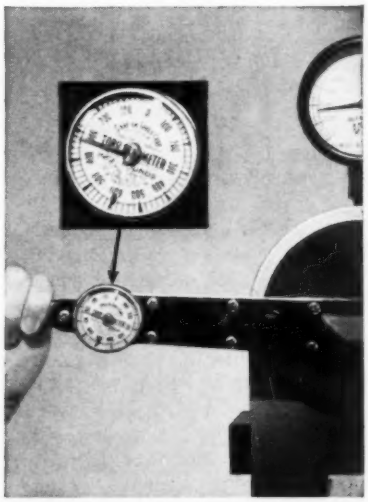
Cap screws require only a clearance fit. Used in a tapped casting, they can be repeatedly inserted and unscrewed without damage to threads.

HOW NOT TO USE STUDS

Studs are not meant to serve as dowels to locate and line up for fastening. To line up numerous studs and bring two pieces together raises assembly cost. Use dowel pins for alignment and use cap screws for fastening to achieve greater economy.

Screw develops high thread tension . . . and stays locked in place

RB&W TENSILOCK screw, despite the friction of the toothed flange, develops 4000 pounds tension with on-torque of 240 inch-pounds.



An off-torque of 330 inch-pounds fails to break loose the grip of the teeth. Tension is maintained by TENSILOCK screw.

Here is a locking fastener where the on-torque effort not only *anchors* the screw but also develops high preloading, or residual tension.

Like high tensile cap screws, RB&W's TENSILOCK* screws also give a high thread tension to torque ratio. But there's one important difference. The TENSILOCK fasteners lock with *teeth* as well as high residual tension.

RATCHET-LIKE LOCKING

Carburized teeth on flange of this one-piece fastener are so angled as to afford easy torquing. They bite into the seating surface when fastener is fully tightened. A circular groove in the flange increases flexing action and enables flange to maintain pressure on the imbedded teeth. To *loosen* a tightened TENSILOCK fastener thus takes much more effort than the on-torque. And it can be reused with little loss of this holding power.

FRICTION STOPS SLIPPAGE

The full clamping force exerted by these fasteners prevents slippage of the fastened members where lateral movement is possible because of large or eccentric holes. The positive gripping enables them to stay tight even under conditions of severe vibration or cyclic temperature fluctuations. RB&W TENSILOCK nuts also available. Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, New York.

*Trademark Pat. applied for

Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. Additional sales offices at: Ardmore (Phila.), Pa., Pittsburgh; Detroit; Chicago; Dallas; San Francisco.

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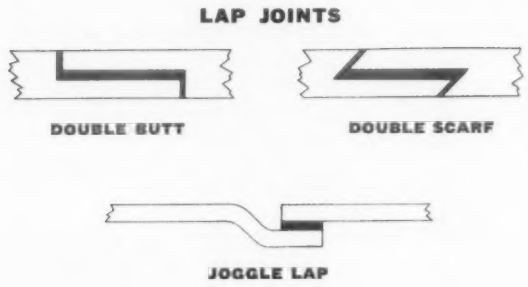
STRUCTURAL ADHESIVES

A discussion of a new class of adhesives which can meet many metal joining requirements.



Today there is a fast moving parade of new design concepts involving new alloys and plastics, contours for more pleasing eye appeal, and new methods for increasing productivity. To keep abreast of these new concepts, four basic advantages of the new structural adhesives warrant consideration by the design engineer.

First: Adhesives distribute stress evenly and impart flexibility to the entire joint area. There are no localized stress concentrations at points of contact with adhesive bonds. This is an important consideration in joining thin sheet to heavy gage metal.

Flexibility along with uniform distribution of stresses helps improve resistance to vibrational fatigue. Most structural adhesives have the property of some elongation even though minute. This property permits the transfer, distribution and absorption of stresses in delicate structures required to do a rugged job. Bonded helicopter blades* are an example of such structures.

Second: Adhesives provide continuous contact between mating surfaces. With this continuous contact there are no voids in which moisture or other corrosive matter can accumulate. Sealing and bonding is accomplished in one operation. The presence of an electrically non-conductive adhesive-line between dissimilar metals will prevent bimetallic corrosion.

Third: Adhesives can maintain the integrity of critical structural members without influencing the physical properties of metal. This ability eliminates the necessity of hole preparation in structural plastics or other materials for which mechanical fastening systems are not fully developed.

Fourth: Adhesives produce smooth, unmarred contours. This is important in this day when product styling is so often considered on a par with product performance.

*See "Bonding of Helicopter Blades," March 1959, Assembly and Fastener Engineering.

Developments in the field of polymer chemistry have made possible the commercialization of many load-bearing adhesives. For simplification they can be classified as thermosetting and chemically-curing types. The elastomeric modified phenolics are typical examples of the former; the one and two component modified epoxy-based adhesives are examples of the latter.

The elastomeric-phenolic adhesives are finding increased usage because of their range of desirable properties. Shear strength is in the range of 3000 psi with structural limits as high as 350°F. Flexibility, vibration and shock resistance, and peel strength are excellent. Applications involving thin gage metal subjected to shock, as well as dissimilar metals with unlike coefficients of expansion, are indicated.

These products are available as solvent solutions or as dry films. The solvents are sprayable, brushable and roll-coatable. Thorough drying after application to the bond surface is necessary before heat-curing. Any residual solvent in the adhesive will cause a porous bond. The film-form adhesives are of increasing interest because of convenience of handling. Equipment for application and drying are not necessary.

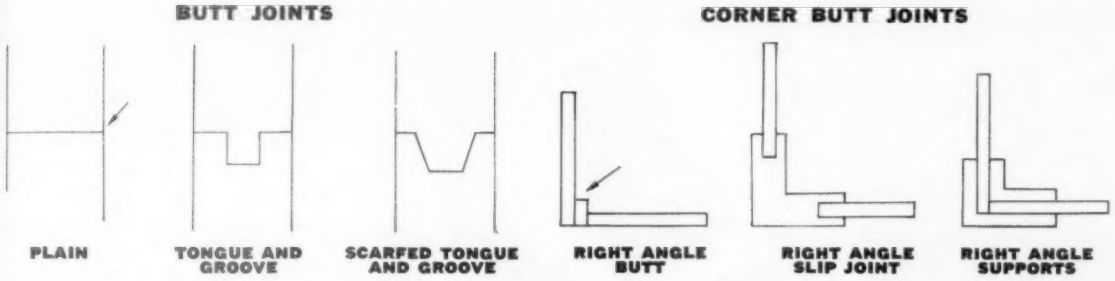
High strengths are accomplished by curing with heat in the range of 350-400°F under pressures of 35-100 psi. Time of cure depends on the strength required by the user and the mass of the object being bonded. Depending upon the materials to be joined, adequate bond strengths for many applications can be obtained in as little as 60 seconds.

The chemically curing types are usually based upon epoxy resins modified to give a wide range of properties. They contain no solvents requiring predrying and are available in liquids or mastics.

The two-component types consist of a base and activator which, when mixed in proper proportions, will cure at room temperature without pressure.

by **E. F. Hess,** Product Manager
Adhesives, Coatings and Sealers Division
Minnesota Mining & Manufacturing Company

FOR JOINING METALS



NOTE: Arrows point to cleavage joints which should be minimized or eliminated.

After mixing they must be used within a specified time which is referred to as "pot life."

High strengths at room temperature in the range of 2500-3500 psi are normal. Strengths at temperatures normally encountered outdoors range up to 1500 psi. Strength drops off rather rapidly in the 180-200°F range. Fuel resistance is excellent. These products tend to produce rigid bonds; therefore, they work best on uses involving constructions where peel stresses are unlikely, or can be designed around.

The one-component types are interesting in that certain properties (such as peel strength) approach those of the thermosetting types, and they do not require pressure jigs during cure. An activator, dormant at room temperature, is added during manufacture. When subjected to temperatures of 320°F or greater, the activator cures the adhesive.

Strengths at room temperature are in the 3000-5000 psi range, with structural strengths maintained up to 300°F. Properties such as flexibility and peel can be good, depending on modifications by the manufacturer. Water and fuel resistance are good.

The rate of cure is a function of temperature. Cures at 350°F require approximately one hour, while a cure at 500° F requires as little as one minute, depending on heat lag in object being bonded.

Here then are a group of structural adhesives available to the design engineer. Selection of logical products for consideration can be made on the basis of strength requirements, conditions of exposure, and availability of equipment for heat and pressure.

After an adhesive has been selected, correct use is required for ultimate performance. This is no different than with welding or riveting. Certain aspects of joint design, surface preparation, and curing equipment are important and warrant elaboration.

Two fundamentals should be kept in mind. First, joints should be designed so that the maximum amount of bond area is put to work at the same time. Second, the geometry of the joint will determine whether or not you will achieve maximum strength.

An analysis of the four pure stresses illustrates the first fundamental. Tensile and shear are desirable because all the adhesive is working. Cleavage, which is analogous to opening a book, utilizes only a portion of the bond area and is not favorable. With peel stresses, only a theoretical line of adhesive, which is a minute fraction of the total bond area, is being utilized. Even more so than cleavage, peel stresses should be minimized or eliminated.

We recognize, however, that seldom is only one stress involved. This is where the geometry of joint design should be given consideration. Lap shear joints are most commonly encountered in joining of thin gage metal. When a lap joint is stressed in shear, the bond area tends to pivot about an axis because the metal adherents are not in line with the adhesive. This applies cleavage stresses at the edges of the bond. In most cases, this simple lap joint will be adequate, but performance could be upgraded by redesigning the joint to place the metal in line with the adhesive or by incorporating locking devices.

The double-butt and joggle joints place the metal in line, while the double-scarf also incorporates a locking device. Butt-joints are usually encountered when heavier gage metal is involved.

Joining sheet metal at corners to form a box-like construction is also possible with adhesives. But the usual right angle joint used for riveting or spot welding is not recommended. The incorporation of extrusions with recesses or right angle supports tends to eliminate or minimize cleavage stresses.

Surface preparation is also very important. An adhesive depends on molecular polar attractions, and to a lesser extent on mechanical adhesion for ultimate performance. Contaminants such as grease, oil, moisture, and loosely adhering oxide films interfere with adhesion. Surfaces chemically etched or blasted with an extremely fine abrasive grit are preferred.

continued

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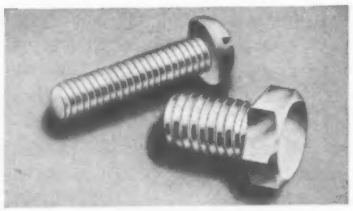

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Freshly machined surfaces which have been subsequently vapor degreased are often adequate.

The final operation is curing the bond. Equipment for bonding can be divided into two classes, namely heat and heat/pressure sources, depending on the type of adhesive involved. Though structural adhesives have not reached a point of acceptance that standardized bonding equipment is available, there are many sources of heat and pressure available.

Available heat sources include circulating air, infrared ovens, steam heat in the form of platens or autoclaves, electrical resistance in the form of platens or strip heaters, and high frequency in the form of dielectric or induction heating.

Since the recommended adhesive cure cycles pertain to the time the adhesive is at the specified temperature, efficiency of heat transfer from the source to the part is important.

Pressure sources, where necessary in conjunction with heat, are also varied. Important in applying pressure during cure is the maintenance of constant pressure over the entire bond area and supplying pressure follow-up.

Pressure jigs can be of simple torqued spring loaded types. Where the rate of production is important, quick-clamp pressure jigs on indexing tables can be utilized. Another source of pressure is hydraulic or pneumatic rams. Pressure can be transmitted to a flat part through platens or to contoured parts by platens of the matched die type.

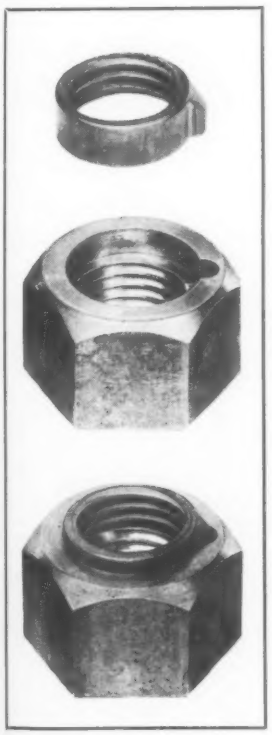
The use of vacuum is another means of applying pressure. Equipment of this type is adaptable to parts involving large areas. When the two sections are closed over the part, an applied vacuum causes the rubber blanket to conform and apply uniform pressure over the entire part. Heat for curing is supplied through an electrically or steam heated table which is the lower section of the equipment. •

This article is based on an address by the author before the American Society of Body Engineers annual convention, in Detroit, October 21-23.

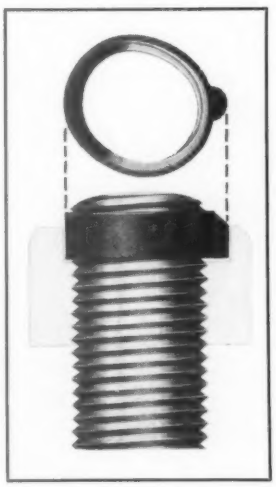
FASTENERS FOR HEAVY-DUTY EQUIPMENT

Use of locknuts in sizes up to 4 inches can provide easy serviceability of roadbuilding machinery, metalworking presses, etc.

by **William R. Racine,** President
The Security Locknut Corporation



Designed for use on heavy-duty equipment, this locknut is a combination of a standard nut and a spring steel retainer, fabricated into a single unit. Below is a phantom view of the nut on a bolt. Note that the insert lifts slightly away from the nut body to act solely as a locking device.



Sometimes, not enough pre-assembly attention is given to large fasteners used on heavy-duty equipment, such as earthmoving machinery, farm implements, crawler tractors, metalworking presses, mining equipment, etc. This is especially true with the prime assembler or manufacturer who considers fasteners as just so many more hardware items. The result is that the fastening method, even for critical assemblies, often takes a back seat in the original design.

Some manufacturers of large equipment have indicated that this has been due in part to a scarcity of nuts of the self-locking type in sizes above 1" diameter. But this is a thing of the past. There are available today several different types of locknuts in sizes ranging up to 4" or a little larger.

The use of these locknuts can provide benefits beyond those for which they are normally purchased, i.e., to hold the parts in place. They can provide for easy serviceability of parts subject to much wear in ordinary service, necessitating removal, adjustment, or replacement. In some cases they can cut the cost of assembly or assure a better appearance than is possible with other fastening devices.

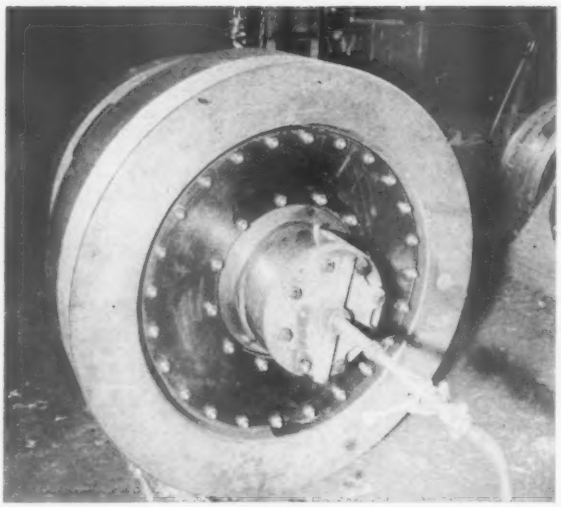
Moreover, the use of self-locking nuts eliminates drilling holes in bolts for the insertion of safety wire used in conjunction with conventional nuts. This is an important consideration with large bolts used in critical joints subject to great stresses, as there is less chance for failure due to bolt fatigue. Also,

continued

there is no need for peening the bolt threads. This old fashioned locking method made removal of the fastener a time-consuming operation, as well as rendering the fastener useless for re-application.

We recently observed the servicing of a car retarder in a railroad freight year. This retarder had been assembled entirely by using drilled bolts with slotted nuts and cotter pins. The unit had been in the yards about three months when it became necessary to replace the retarder rails with heavier rails. It took a four-man crew nearly four hours to disassemble the unit which contained only 56 nuts and bolts. Re-assembly was even more time-consuming as the hole in each bolt had to be lined up with the slot in its mating nut for insertion of a cotter pin. In this instance the original equipment manufacturer could have reduced this high maintenance cost by simplifying the hardware in this design.

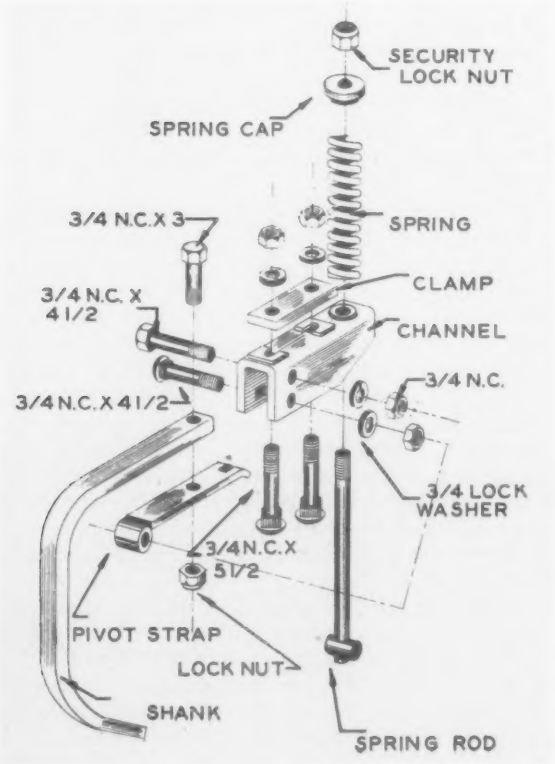
One type of locknut which has a variety of applications in heavy-duty equipment is one which combines a standard nut and a spring steel retainer, fabricated into a single unit. The retainer is an elliptical threaded insert made from high carbon steel, heat-treated to give it spring-like qualities, thereby developing a high-locking radial pressure on the thread of the bolt. This spring steel lock will remain effective up to 650°F.



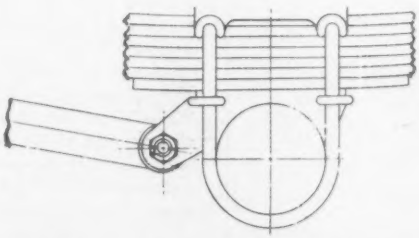
On clutch for a large machine, 36 locknuts (⅝" size) are used to fasten the top locking plate in position, replacing drilled bolts, slotted nuts and wiring.

The threads of the spring-steel inserts are so positioned in relation to the threads of the parent nut that, as the bolt is tightened, the insert lifts slightly away from the nut body. The load is carried only on the nut body, with the insert acting solely as a locking device. Rotation of the insert is prevented by an ear which projects into the

On this farm implement, locknuts are used to permit easy disassembly for replacement of parts when needed. Also note that locknut is used on the spring adjustment.

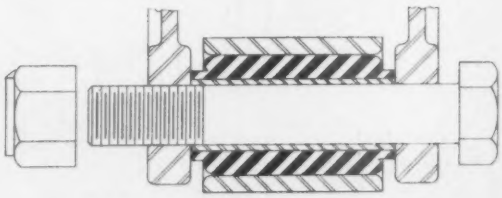


The torque arm attachment is a critical part of Reyco axle suspension unit. Locknut permits proper pulldown torque and adjustment. User instructions are furnished as shown.



TORQUE ARM ATTACHMENT TO AXLE SEAT

CROSS-SECTION OF ATTACHMENT TO HANGER BRACKET



With the torque arms in this position and other parts assembled, lower the weight of the empty trailer on to the tandem. With the weight of the empty trailer resting on the tandem, tighten the ⅞" locknuts on the torque arms bolts to a torque of 250 foot-pounds.

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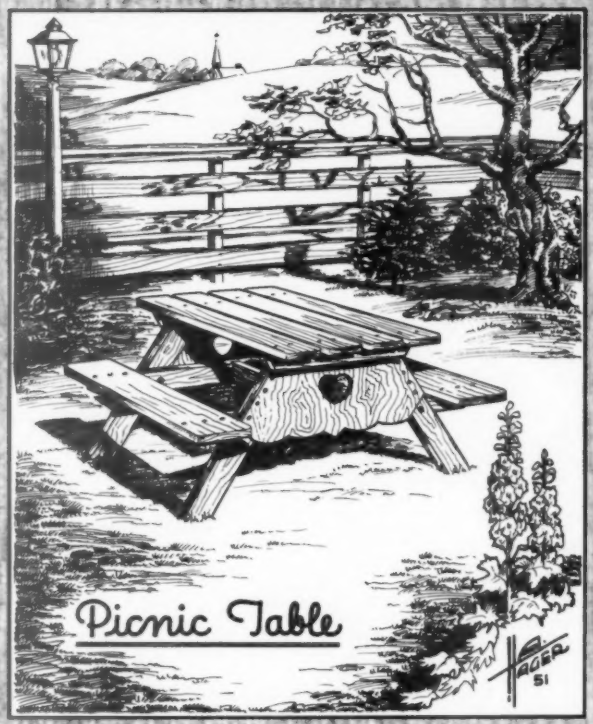

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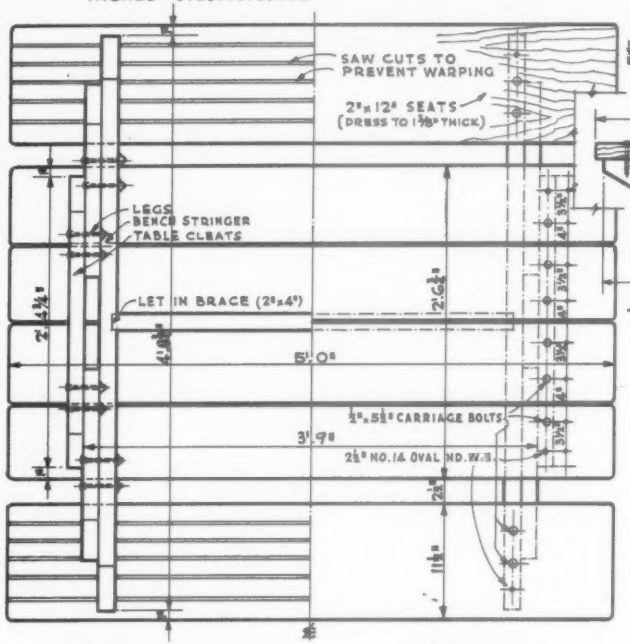
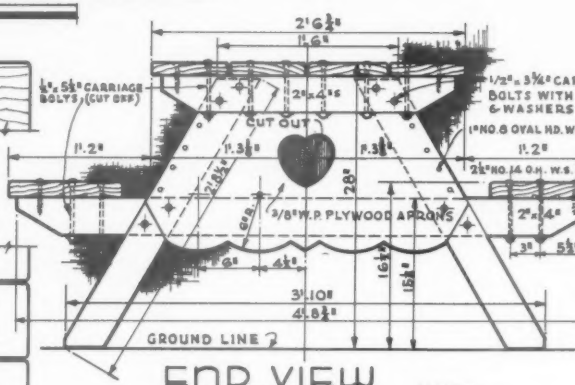
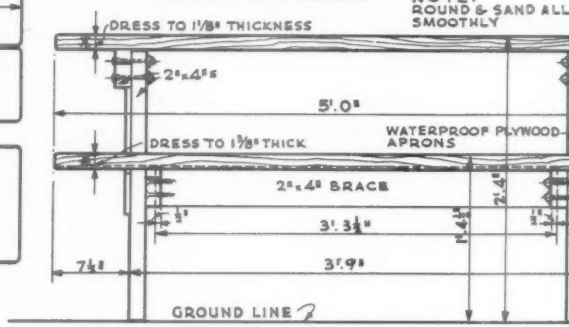


PLAN



END VIEW



SIDE VIEW

NOTE: ROUND & SAND ALL SMOOTHLY

BILL OF MATERIAL

	LUMBER		
*	4 PCS.	2" x 8" x 5'.0" LONG	TABLE TOP (DRESS TO 1 1/8")
*	2 "	2" x 12" x 5'.0" "	SEATS (" " 1 3/8")
	2 "	2" x 4" x 2'.4 3/4"	TABLE CLEATS
	2 "	2" x 4" x 4'.8 3/4"	BENCH " CYPRESS OR FIR
	4 "	2" x 4" x 2'.8 1/2"	LEGS " "
	1 PC.	2" x 4" x 3'.3 1/4"	CENTER BRACE
	2 PCS.	3/8" x 17" x 32" (WATERPROOF PLYWOOD)	APRONS

	"ROCKFORD" SCREWS & BOLTS	
12	1/2" x 3 3/4"	CARRIAGE BOLTS NUTS & WASHERS
4	1/2" x 4 1/2"	" " " " "
20	1/2" x 5 1/2"	" " " " "
12	2 1/2"	NO.14 OVAL HEAD WOOD SCREWS
16	1"	NO.8 " " " "

NOTE:
IF UNABLE TO OBTAIN CARRIAGE BOLT LENGTHS GIVEN USE LONGER ONES AND SAW THEM OFF AFTER ASSEMBLING

Thank Y
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& SNAP SHOTS
PROJECTS YOU

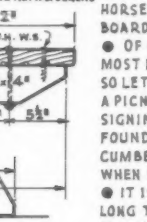
3-19-51 HAGER DESIGN STUDIO.

INSTRUCTIONS...

- IT'S TIME OF THE YEAR WHEN WE SHOULD ALL BE GETTING THE PLEASURE & BENIFITS OF THE GREAT OUT OF DOORS BY PLAYING RELAXING & ENJOYING OURSELVES IN THE FRESH AIR & SUNSHINE.
- MOST OF US CAN DO THIS RIGHT IN OUR OWN BACK YARDS. IF YOU HAV'NT ALREADY SET ASIDE A SECLUDED SPOT PLAN TO DO SO NOW.
- IF SPACE PERMITS BUILT A SIMPLE OUTDOOR FIREPLACE WHERE COOKING CAN BE DONE, A HORSESHOE COURT, CROQUET OR SHUFFLE-BOARD WILL ADD TO THE FUN.
- OF COURSE COMFORTABLE SEATING IS MOST IMPORTANT TO COMFORT & RELAXATION SO LET US "START WITH IT. PROJECT NO.2 IS A PICNIC TABLE VERY EASY TO BUILD. IN DESIGNING IT I HAVE CONSIDERED THE FAULTS FOUND IN MANY. LONG HEAVY TABLE ARE CUMBERSOME TO MOVE AROUND, ESPECIALLY WHEN MOWING THE LAWN.
- IT IS BETTER TO HAVE TWO TABLES 5 FEET LONG THAN ONE EIGHT TO TEN FEET LONG.
- I HAVE MADE THE TABLE HEIGHT 2" LOWER SO CHILDREN TOO CAN EAT COMFORTABLY, (STANDARD HEIGHT IS 30") DISTANCE FROM EDGE OF SEAT TO TABLE HAS ALSO BEEN DETERMINED FOR ADDED COMFORT.
- "ROCKFORD" BOLTS & SCREWS WILL MAKE ASSEMBLING EASY & STURDY.
- AFTER ASSEMBLING IS COMPLETE SAW OFF PROJECTING BOLTS & ROUND AND SAND ALL CORNERS SMOOTHLY THEN FINISH TO SUIT.
- IF NATURAL FINISH IS DESIRED APPLY 2 COATS OF HOT, BOILED LINSEED OIL WORK WELL INTO WOOD AND ALLOW A COUPLE OF DAYS TO DRY BETWEEN COATS.
- IF PAINTED APPLY 2 COATS OF HIGH GRADE LEAD & OIL PAINT

"Good Picnicing"

Hobby-neering ©



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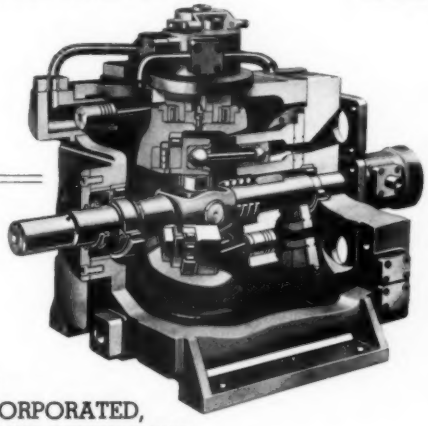

A cutaway view of the Vickers-Waterbury (oil) hydraulic pump. These units are manufactured in sizes ranging from 1¼ (28.4 GPM at 3000 PSI, 1200 RPM) to size 300 (2277 GPM at 3000 PSI, 1200 RPM). Pump and Motor together serve as transmissions and in the size ranges indicated can deliver a maximum output of from 45 H.P. to 3600 H.P.

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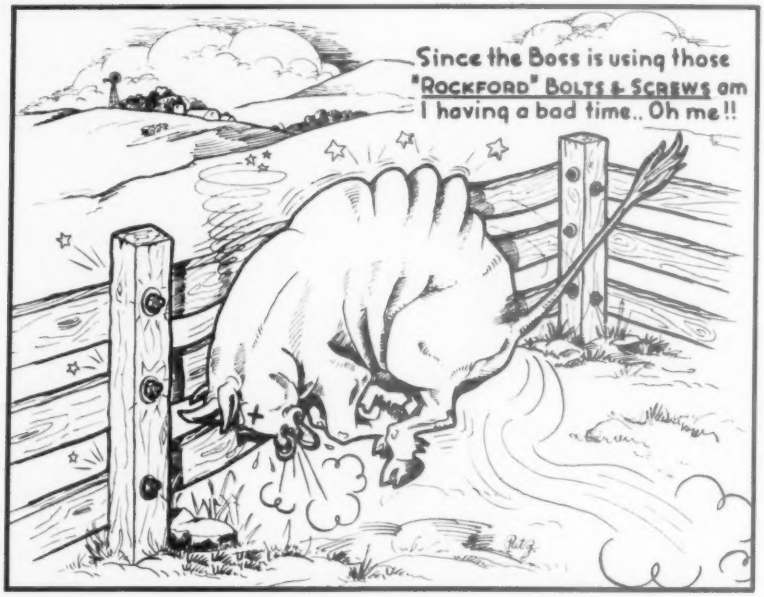
WATERBURY 20, CONN.

☆ DOWN ON THE FARM ☆



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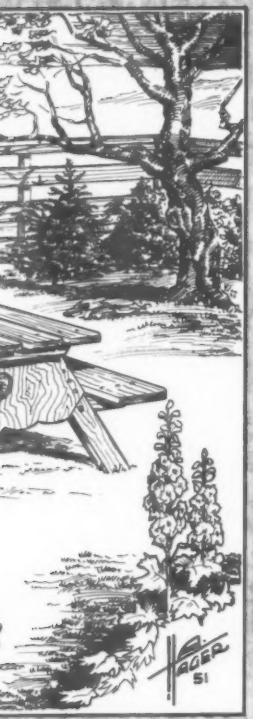

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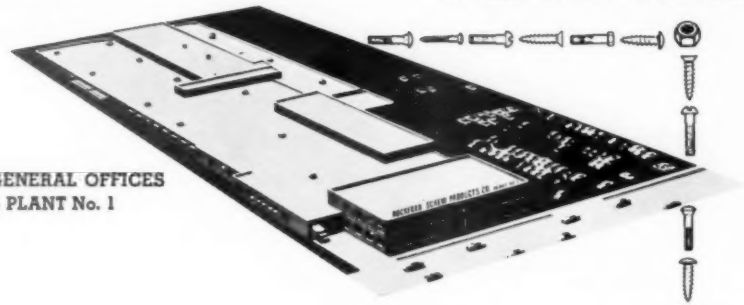

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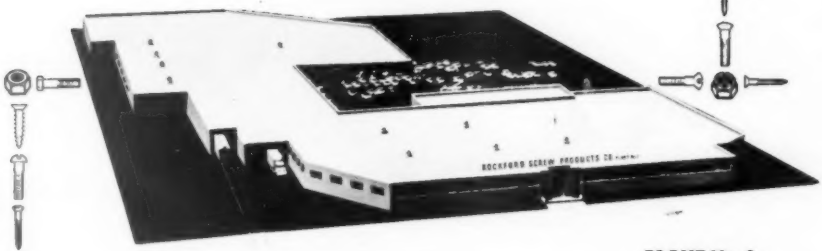
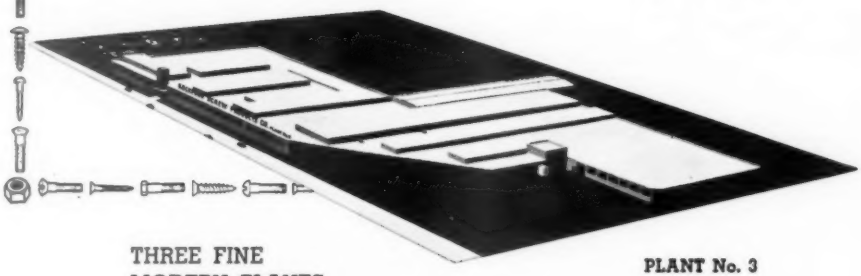
& PLANT No. 1



PLANT No. 2



PLANT No. 3

THREE FINE
MODERN PLANTS
PRODUCING *"ROCKFORD"* QUALITY CONTROLLED
THREADED FASTENERS FOR AMERICAN INDUSTRIES.

For Additional Copy of this Plan
Use Postpaid Card. Circle No. 310

ROCKFORD SCREW PRODUCTS CO.

Hobby-roning

"ROCKFORD"®
HOME WORKSHOP

crown of the nut. This type of nut may be re-used many times without loss of its locking effect. It can be power-wrenched or hand-wrenched (as soon as the insert is engaged) like any ordinary nut with prevailing torque.

Locknuts of this type are made in sizes ranging from ½" up to 4". Body styles include finished hexagon and heavy series in full thickness; thin series are also available. The heavy series is made with coarse threads, while the finished hexagon series is available in either coarse or fine threads.

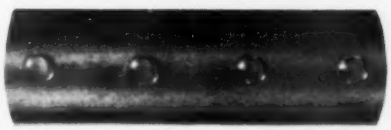
In addition to the advantages cited earlier, the following will be of interest to engineers. More accurate torque can be applied to this type of nut than on slotted nuts where the drilled hole in the bolt must match the slot in the nut for insertion of safety wire or cotter pins. The cost may be less when compared to slotted or double nuts when the labor saving advantage is considered. Finally, a single locknut can often replace another fastener composed of two, three or even four parts. •

Bearing caps on heavy metalworking presses are securely fastened in place with locknuts.

ALLEN

Allenpoint's deep, full-circle bite assures tremendous resistance to removal torque! Stays tighter longer!

When you need a set screw that you can depend on to stay tight under heavy strain and vibrations, specify ALLENPOINT. Here's why you can always depend on ALLENPOINT: proper design of the cup diameter results in a rugged grip that makes the full-circle pattern you see here . . . deep, strong, clean sockets allow full wrenching leverage . . . and uniform Class 3A threads assure a tight friction lock over the entire length of Allenpoint Set Screws.



Ask your ALLEN Distributor for samples and full engineering details—he's always ready, willing, and able to give you prompt, practical service!

50 ANNIVERSARY YEAR ALLEN HEAD 1910-1960

ALLEN MANUFACTURING COMPANY

HARTFORD 1, CONNECTICUT, U.S.A.

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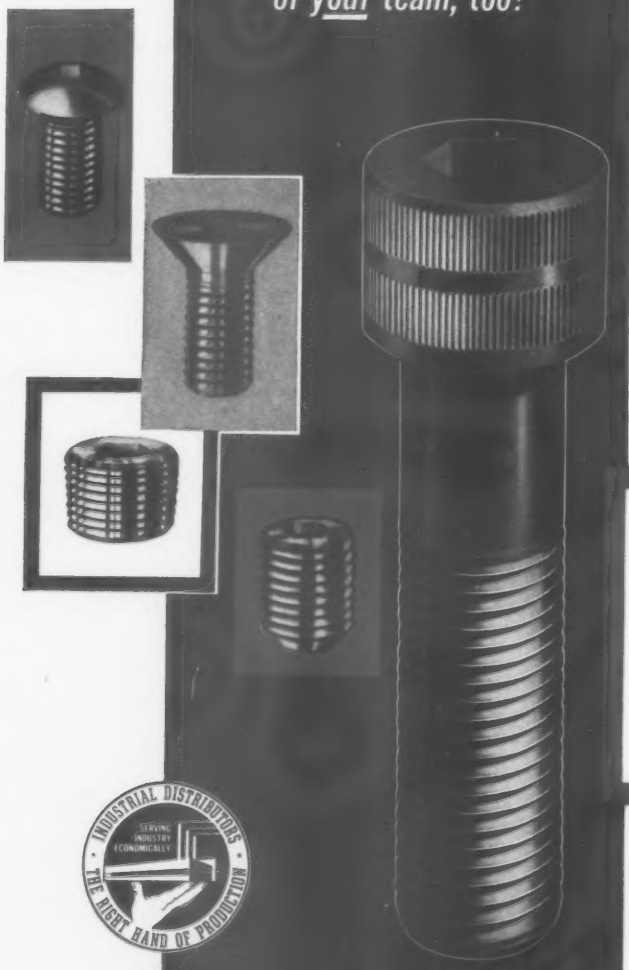
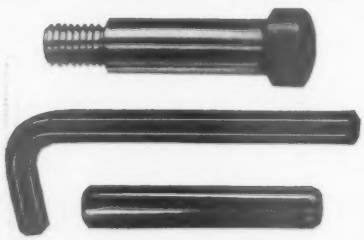
INDUSTRIAL DISTRIBUTORS ARE PART OF THE H-K TEAM

. . . and important members of your team, too!



- Since the company was founded in 1929, Holo-Krome Forged Socket Screw Products have been sold only through authorized, stock-carrying industrial distributors. We believe this method of distribution is both economically sound and efficient. Distributors carry an adequate stock of H-K products right to the door of your plant; they provide on-the-spot engineering assistance; their knowledge of local problems means you get the products you want, when you want them, in the quantity you need.
- H-K's distributor team is as important as any department of our company. To back up our distributors, we are continuing to improve our product quality as well as our packaging, labeling, shipping, telegraph quoting service—and our unmatched SAME-DAY SERVICE on standard items.
- Know your Holo-Krome industrial distributor; call on him for assistance; rely on him for prompt service and technical help...

HE'S A RESPECTED MEMBER OF THE H-K TEAM!



HOLO-KROME SOCKET SCREWS

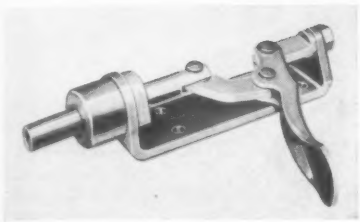
THE HOLO-KROME SCREW CORPORATION • HARTFORD 10, CONN.

Sold only through Authorized Industrial Distributors

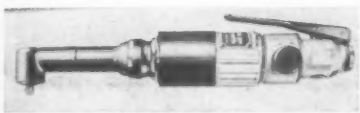
Use postpaid card. Circle No. 233

WHAT'S NEW IN EQUIPMENT

For information on any equipment listed here, use the postpaid card opposite page 66. Just circle the number on the card matching the number following the description. We'll do the rest.



(See 3)



(See 4)

(See 5)

(See 1)

SPIKE WELDER FOR COATED METALS, ELECTRONIC PARTS

A spike welder, capable of 500 welds a minute, will turn out blemish-free welds of coated metals and ⅛" aluminum pieces. It produces 100,000 amp. pulses of about one millisecond duration, yet requires no additional service lines.

The unit will weld studs, clips and brackets to vinyl and lacquer steel without damage or discoloration to the coating. Production is 500 pieces per minute. Similar applications include chrome and copper plate, dissimilar and non-ferrous metals.

Critical welds can be made on electronic parts such as transistors and diodes. The extremely short heat time duration of the welding pulse prevents damage to small parts.

Weldex Division, The Metal/Craft Co., 3300 Doris St., Detroit, Mich.

Use postpaid card. Circle No. 1

SOLDERING FLUX WITHOUT CORROSIVE FUMES, RESIDUE

An organic-acid-based flux leaves no corrosive residue after soldering. No. 641 flux is recommended for continuous tinning of copper wire.

Product-tested by the manufacturer for several years, the flux is also free from corrosive fumes which damage stock and equipment.

Blackstone Corp., Jamestown, N.Y.

Use postpaid card. Circle No. 2

PLUNGER TOGGLE CLAMP WITH SWIVEL HANDLE

A plunger-type toggle clamp with a swivelling handle for use where clearance requirements do not permit using conventional clamps has been added to the standard line of De-Sta-Co clamps.

Designed for medium-duty holding applications, the Model 606 handle swivels in a 220° arc and can be fixed in any position within this arc by a locknut located on the axis of rotation.

Rated holding pressure of the new clamp is 450-lbs. A tapped hole in the plunger allows the use of an adjusting spindle for extending its reach. The base, which is only 1-1/8" wide, has six mounting holes for easy positioning on standard tooling and aircraft industry assembly plates.

Detroit Stamping Co., 350 Midland Ave., Detroit 3, Michigan.

Use postpaid card. Circle No. 3

24 ANGLE-HEAD DRIVERS ADDED TO AIR TOOL LINE

A 24-member family of 90° angle-head reversible screwdrivers and nutrunners has been added to a line of portable air-powered tools.

Four basic models—1750, 1000, 700, and 500 rpm—expand to a large family with the choice of two throttle types (lever and lock button) and three different spindles (¼" and ⅜" square and ¼" female hexagonal).

The right-angle heads provide for close-quarter operation under power, while the reversible feature permits fastening or loosening with the same tool. Conversion from nutrunner to screwdriver may be accomplished by changing the work spindle.

Rated capacity of all models is ¼"; weight is balanced from 2⅛ to 2¼ lbs., head length is a maximum of 11⅝".

Buckeye Tools Corp., 5003 Springboro Pike, Dayton 1, Ohio.

Use postpaid card. Circle No. 4

TORQUE WRENCH FOR CONFINED SPACES

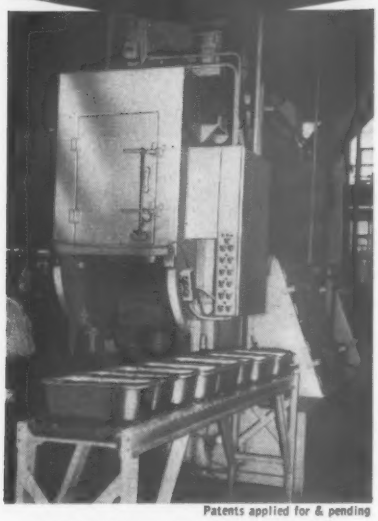
A dual handled torque wrench for one-man tightening is designed for use in confined spaces. Less than 3/4" rotary travel gives a total torque range of 100 inch-pounds.

A dial-indicator type torque tool, Model TDF-100 torques both left and right. The bar is made of alloy steel which will retain its setting despite rough usage. Indicator housing and handles are of lightweight aluminum. Over-all length of the tool is 20" and weight is 3 pounds.

Dial range is plus and minus 0 to 100 ft.-lbs. with minimum graduation equal to 5 ft.-lbs. Smaller grads upon request. A 1/4" square drive with spring ball lock fits all standard wrench attachments.

A larger size torque tool, Model TDF-600 for heavy-duty torquing, is also

Only INDUSTRIAL'S DRUM JET WASHER



Patents applied for & pending

CLEANS THE TOTE PAN AS WELL AS THE WORK ***without separating one from the other in the process!***

Such "togetherness" has long been the wish of producers of *screw machine products and other small parts* . . and Industrial's ingenuity has made this wish come true.

Industrial's exclusively designed Model DJ provides efficient washing, rinsing and drying of volume parts . . right in their own tote pans.

Now get thoroughly clean and dry tote pans as well as *screw machine products and other small parts* with no more mixed loads . . and no more subsequent re-sorting to steal time and run up costs.

ADDITIONAL FEATURES

- Rotational action is adjustable for variable high or low speed tumbling of work
- Washer processes 1 to 3 tote pans of work per minute and requires but one operator
- Machine is adaptable for complete automation
- Smaller production model also available

Don't delay *— write today for complete details and growing list of present users in your industry.*

ISC INDUSTRIAL SYSTEMS COMPANY

Exclusive Sales Agents for
INDUSTRIAL WASHING MACHINE CORP.
31 Main Street, Matawan, N. J.

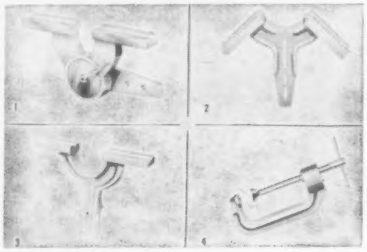
Use postpaid card. Circle No. 228

available. This has a range of plus and minus 0 to 600 foot-pounds.

Apco Mossberg Co., 1010 Lamb St., Attleboro, Massachusetts.

Use postpaid card. Circle No. 5

HOLDERS, CLAMPS FOR SHORT RUN JOINING JOBS



Work holders and clamps are designed for short run welding, brazing and soldering on-the-job joining.

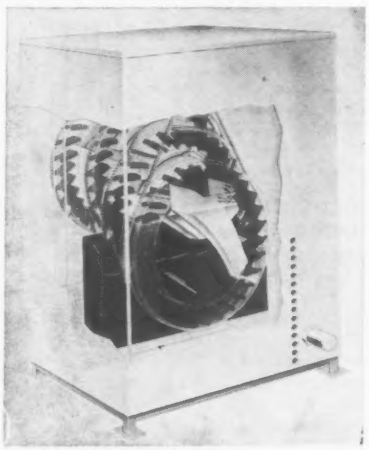
Adjustable holders have clamping faces that can be set at angles from 0° to 180° with a calibrated dial and single handle. The right angle type has clamp faces set at 90°. A straight type is designed for butt joints. Two can be locked together for making T-joints.

Clamps are available in standard and quick-acting types in 3", 4" and 6".

Wales-Strippit, Inc., 241 S. Buell Rd., Akron, New York.

Use postpaid card. Circle No. 6

UNIT CLEANS, DEGREASES PARTS ULTRASONICALLY



An automated ultrasonic process integrates cleaning and degreasing with high speed production of metal parts. AutoSonex processes machined and sheet metal parts as fast as they come off automatic fabricators.

The unit features a series of four rotating wheels with evenly spaced cubicles to hold the metal parts. As the parts move automatically through the wheels, they are first immersed in a degreasing solution, powered by ultrasonics, rinsed, then drained and finally passed through an isolated solvent drying chamber before being discharged.

Metalclean Equipment Co., P.O. Box 177, Bala Cynwyd, Pennsylvania.

Use postpaid card. Circle No. 7

OPEN END-BOX TYPE WRENCH LINE EXTENDED

A line of open end-box type wrenches has been extended with the addition of 1-11/16, 1¾, 1-13/16, 1⅞ and 2 inch 12-point opening sizes. The tools are drop forged from alloy steel, heat treated and chrome plated over nickel.

J. H. Williams & Co., 400 Vulcan St., Buffalo 7, New York.

Use postpaid card. Circle No. 8

HYDRAULIC FEEDS FOR PUNCHING, RIVETING

Hydraulic feeds for punching, clamping, riveting, shearing or pressing metals or plastics are powered by shop air.

The feeds require no pumps or motors and eliminate "bounce" at point of break-through or when load is released. Automatic sequence of operations may be performed through trigger valve actuators or solenoids.

Superior Controls, Box 436, Commercial Rd., Crystal Lake, Ill.

Use postpaid card. Circle No. 9

MISSING PARTS DETECTOR PREVENTS DIE OVERLOADS

A multiple feeler assembly stops machines when parts are not ejected on schedule. The unit protects dies from damage-causing overloads.

Properly ejected small parts striking against the multiple feelers of the Type 700-U assembly break a magnetic contact and send the required impulse to the missing parts detector control unit. If the impulse is not received by the control unit, electronic circuits automatically prevent the machine from striking again. Gravity, plus magnetic pull, returns the feelers to normal position after each stroke. The unit can be used on presses with speeds up to 150 spm.

When Philco makes a "Safari" . . .

THOMSON RIVETS

are there!

The "Safari" is the first battery-operated television set to reach the market. This truly is a light-weight, miniaturized step forward in the television industry.

Philco's advanced research and engineering puts television on a "view as you go" basis. Judson L. Thomson Mfg. Co. . . . pioneer in rivets and riveting machines since 1885 . . . salutes one of its best known customers for this notable achievement.

Why use Thomson Rivets? Value analysis proves that rivets belong in product-improvement and cost-reduction programs. No other permanent fastening method can match the combination of fastening strength, assembly speed and inspection ease inherent in riveting. From first cost to last, it rates first consideration.

Judson L. Thomson Mfg. Co., with seventy-five years' experience in engineering rivets and machines to new or existing product demands, offers a plus no other source can top. More than 8000 rivet specifications and more than 200 machine models assure ready answers to your fastening problems.

For help in selecting the right rivet and machine, call the Thomson Fastening man in your area. He's listed in the Yellow Pages of your phone book. In the meantime, you'll want Thomson's new handbook in your files for day to day reference. The coupon below, attached to your company's letterhead, will bring it to you by return mail.

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Judson L. **THOMSON** Mfg. Co.
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Get Rocket-Fast Shipment from world's largest STOCK of Stainless Steel Fasteners

No long countdowns here. Allmetal stainless fasteners are stockpiled in advance—ready to go on your order. Fasteners in Commercial, AN, MS specs. You get fast delivery, precision quality, plus mass production economy when buying direct from stock.

Special fasteners also fabricated to your exact requirements on extremely short notice. Full range of raw materials assures prompt service. Simply send blueprint or specifications.

Pins • Bolts • Nuts • Screws (including slotted and Phillips—magnetic and non-magnetic) • Washers • Cotters • Rivets • Rods • Studs • etc.

PHONE OR WRITE for prompt quotation or shipment. Send for catalog.

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SCREW PRODUCTS COMPANY, INC.

Manufacturers of Stainless Fasteners Since 1929

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Midwest Division
6424 W. Belmont Avenue, Chicago 34, Illinois
Phone: AVenue 2-3232 TWX CG 3185

West Coast Division—Office and Warehouse
5822 West Washington Blvd., Culver City, Calif.
Phone: WEbster 3-9595 TWX LA 1472

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Wintriss, Inc., 20 Vandam St., New York 13, New York.

Use postpaid card. Circle No. 10

VOLTAGE COMPENSATOR AIDS UNIFORM HEAT CONTROL

An automatic voltage compensator (AVC) has been developed for Sciaky resistance welding machines of the Dekatron type.

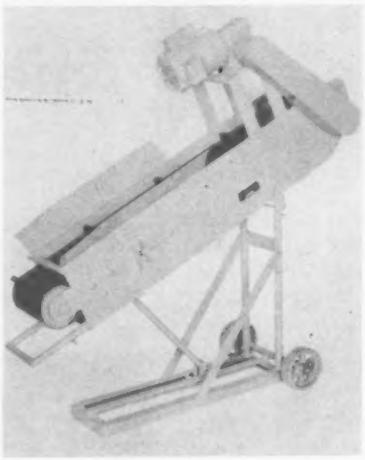
The optional form of heat control is designed to eliminate weld inconsistencies in plants where there are problems of line voltage regulation.

The small cabinet is mounted to the top of the rectifier cabinet. A modified weld phase shift chassis replaces the existing one and a plug box is provided.

Sciaky Bros., Inc., 4915 W. 67th St., Chicago, Ill.

Use postpaid card. Circle No. 11

PORTABLE PARTS HANDLING CONVEYOR UNITS



A line of parts-handling conveyor units are mounted on wheels and have a telescoping handle, making them movable by one man.

The Economy Senior can be adjusted in height and incline angle. The series comes in standard belt widths of 4" through 24" in lengths ranging from 4' through 10'. Standard belt feed is 65' per minute.

Bosworth Mfg. Co., 34250 Mills Rd., Avon, Ohio.

Use postpaid card. Circle No. 12

IMPACT WRENCH DELIVERS 20 PER CENT MORE POWER

A heavy-duty electric impact wrench has been redesigned to give it 20% more power than the previous model. The size 8U has a heavier impact mechanism, a universal motor of 6 amp. (instead of 5), and a T-type socket driver improving power transmission.

The new model is 1/4" shorter, weighs 10 lbs. and has a 5/8" square drive. It runs with a free speed of 1700 rpm and delivers 1725 blows per minute. A collet-type chuck and accessories can convert the Impactool into an all-purpose tool.

Ingersoll-Rand Co., 11 Broadway, New York 4, New York.

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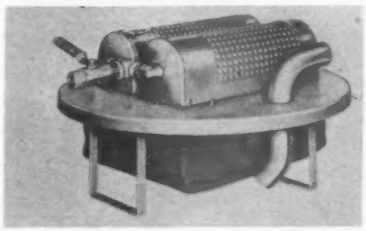
AIR SUCTION UNIT FOR PARTS PICKUP



Combining high suction power of standard, single jet units with doubled air volume and velocity at the suction nozzle, the Twin Jet picks up fasteners, chips and other objects.

The unit operates with ½ air line and hose, drawing 280 cfm air. Velocity is 11,500 ft. per minute through a 2" hose. The units fit any standard 55 gal. drum. There are no motors or moving parts.

Vac-U-Max, 1 Montgomery St., Belleville 9, New Jersey.

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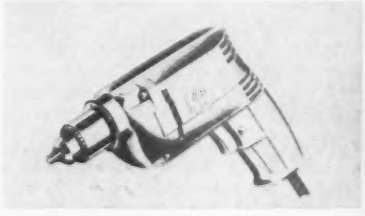
MODEL CHANGES IN PORTABLE ELECTRIC DRILLS



Style, power and weight changes have been incorporated in the seven model Speed-Drill line. The industrial drills are available in either spade-grip or pistol-grip handles and feature

low cost
product
insurance

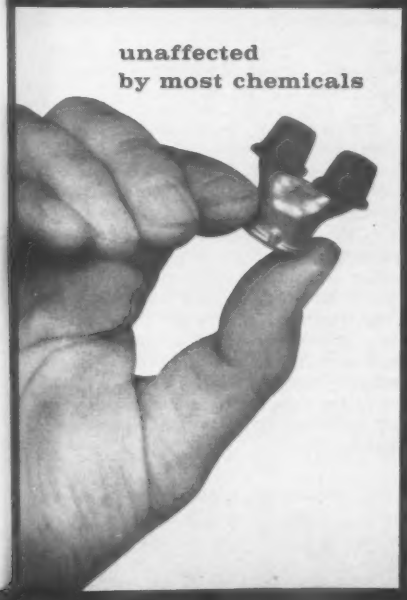
easy to apply

won't chip,
break, shred
or collapse

made of tough,
flexible Polyethylene

Caplugs

take your pick: over 600
sizes in numerous styles
and colors now in stock.



unaffected
by most chemicals

a cinch
to remove

the quickest, slickest protection for products in process, transit or storage...get a free kit full of samples in exchange for the coupon below.

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PROTECTIVE CLOSURES CO., INC.
2207-7 Elmwood Ave., Buffalo 23, N. Y

MAIL a free assortment of Caplugs, literature and prices to us, without obligation.

Name

Title

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at least 3-ampere rating in every capacity.

The portable electric tools are available in ¼", ⅜" and 5/16" sizes.

SpeedWay Div., Thor Power Tool Co., 1421 Barnsdale Rd., LaGrange Park, Illinois.

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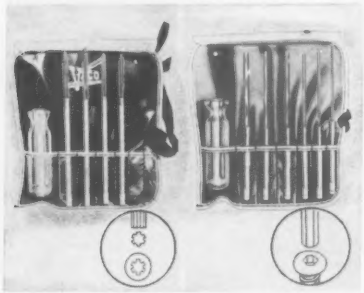
SCREWDRIVER KITS FOR SPLINE, HEX SCREWS



Two screwdriver tool kits feature interchangeable blades. No. ZF40 accommodates all popular sizes of fluted spline recess screws and No. ZA70 is designed for hex recess screws. The kit consists of an amberyl handle with clutch, plus four and five blades.

Vaco Products Co., 317 E. Ontario St., Chicago 11, Illinois.

Use postpaid card. Circle No. 16

ULTRA-CLEAN ASSEMBLY ROOMS IN PREFAB UNITS

Prefabricated clean rooms for critical assembly are available in packaged form. The dust free, constant temperature, humidity controlled areas conform to Mil-Std 120.

The enclosures are made from sandwich type panels, outer walls finished. Air lock entrances with lockers, air showers and various pass-throughs are optional. Temperatures can be held to 1/4°F, relative humidities to 50% or less.

Electrical services, gas and compressed air lines, etc. are flush mounted within the walls. Various degrees of dust control are available. Lighting system provides high level light, for close work, with a minimum of glare.

Packaged Laboratories Div., Agnew-Higgins Inc., 40 S. Los Robles, Pasadena, California.

Use postpaid card. Circle No. 18

DEVICE ASSURES CORRECT SOLDERING GUN TIP TEMP.

A device reduces the tip temperature of soldering guns to 500 or 600 degrees to assure correct temperature when soldering printed circuits and laminated wiring boards.

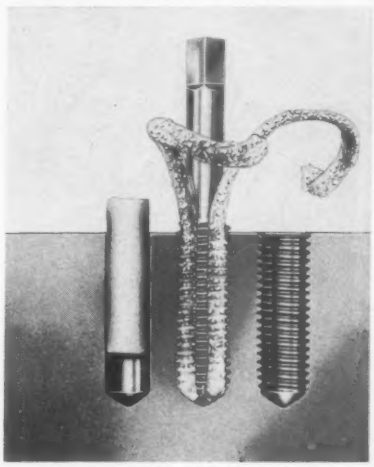
The service technician simply plugs his soldering gun into Gunchoke and the device into the outlet. Two adjustments permit reducing the temperature to either 500 or 600 degrees.

The device also eliminates the need for a slow-heating soldering iron of unknown tip temperature in favor of a quick-heating gun of known temperature.

Electric Soldering Iron Co., Inc., Deep River, Connecticut.

Use postpaid card. Circle No. 19

WAX TAP CARTRIDGES ELIMINATE CHIP PROBLEMS



A new-formula wax pellet eliminates the many chip problems encountered in blind hole tapping operations.

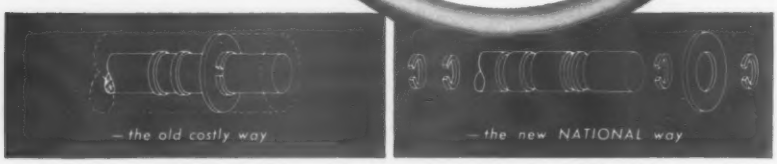
Here's how it works. In the tapping operation, the wax pellet is dropped into the already drilled, or drilled and reamed hole. As the tap works its way into the hole, a solid flow of wax carries the chips along and out the flutes as fast as the chips are made. The last chips left at the bottom of the hole are embedded in that portion of the Tap Cartridge still in the flutes of the tap. Immobilized in this manner, they are withdrawn with the tap. The tap actually touches the bottom of the hole with no chip interference and there is no necessity to clean the tap between holes.

The Design Equation that Saves You Money...

Use easy-to-install, economical National Retaining Rings to locate and position bearings or parts on pins, shafts and in housings. Eliminate grinding or machining shaft stock to form shoulders. You save time and material and reduce weight and space requirements. Ask for data on your specific application, today!

NATIONAL RETAINING RINGS

= improved design + economy!



ALL TYPES AND FINISHES AVAILABLE—National rings are supplied in square, round and rectangular types of carbon spring steel, bronze, beryllium-copper, stainless steel and aluminum in a wide selection of finishes. Send drawings or sample part for recommendations.

The NATIONAL LOCK WASHER COMPANY

Serving Industry Since 1886

NEWARK 5, NEW JERSEY • MILWAUKEE 2, WISCONSIN

Use postpaid card. Circle No. 232

Difficult Riveting Problems Easily Solved By The...

New T-J HYDRAULIC DUAL RIVITOR

With Increased Riveting Production • Quality • Versatility

Added recently to the versatile T-J line of unit and production line riveting and clinching machines is the new Hydraulic Dual Rivitor. The Model HDR will set two ¼" solid steel rivets at once with adjustable spacing from 1-½" to 18" maximum, center to center, being fed from 10" hoppers. Operating cycle is approximately .8 second, at 420 P.S.I. oil pressure furnished from a hydraulic power unit with maximum of 1000 P.S.I. output. For complete specifications write to The Tomkins-Johnson Co., 2425 W. Michigan Ave., Jackson, Michigan for Bulletin HDR-4-59.

For information on other T-J Rivitors and Clinchors write for Bulletin No. 555.

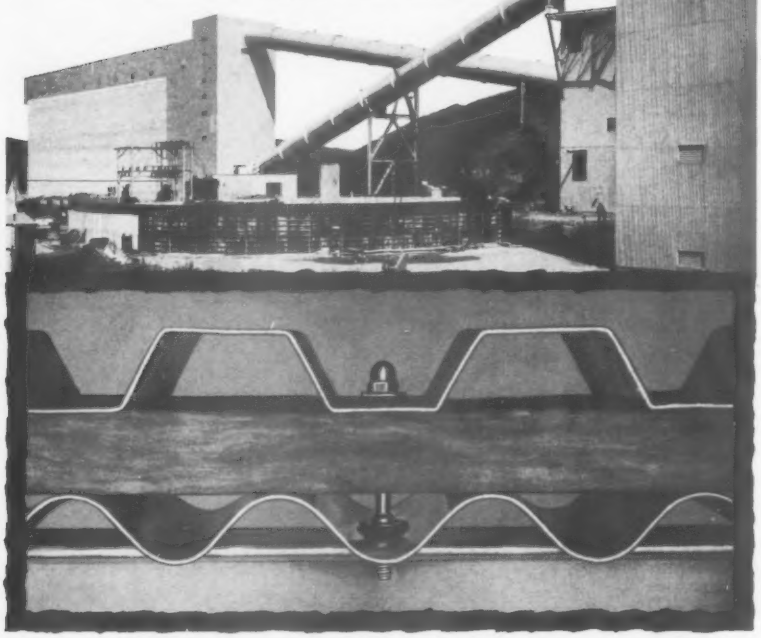
T-J TOMKINS-JOHNSON
RIVITORS ... AIR AND HYDRAULIC CYLINDERS ... CUTTERS ... CLINCHORS

Use postpaid card. Circle No. 238

CW TOPSEAL Fasteners

for Field Built Curtain Walls using any combination of inner and outer sheets.

Coal preparation plant at Maple Creek Mine of U. S. Steel. Curtain Walls are galvanized steel sheets fastened with CW TOPSEAL Fasteners. Erected by American Bridge Division



A single CW TOPSEAL fastens interior sheet to steel; supports insulation without crushing; attaches exterior sheet. (WEATH-R-SEAL® Washer and cap nut available in colors.)

New Curtain Wall Construction and Converting non-insulated buildings to Curtain Wall Construction.

Each Quality Feature designed for Better Fastening — Faster Erection — at the Lowest Installed Cost per Square.

Approved, Specified, Used Everywhere. Bulletin FA-1158 on Request.

Pat'd. & Pats. Pending

FABCO

Avoid 'look-alike' substitutes . . . Specify genuine TOPSEAL® Fasteners

FABRICATED PRODUCTS CO.

West Newton, Pa.

manufacturers of "Topseal System of Structural Fastening"®

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Cartridges are available in sizes 0-80 through 1¼". They can be used equally well in steel, iron, aluminum, plastics, and the newer exotic metals.

The Tap Cartridge Company, P. O. Box 1017, Cincinnati 1, Ohio, Dept. AR.

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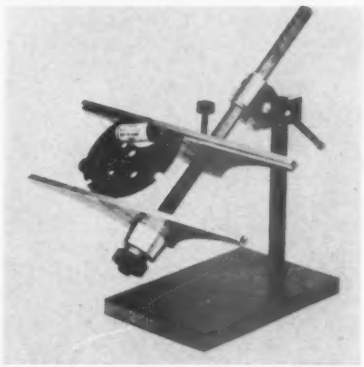
PRINTED CIRCUIT BOARD HOLDER IS ADJUSTABLE



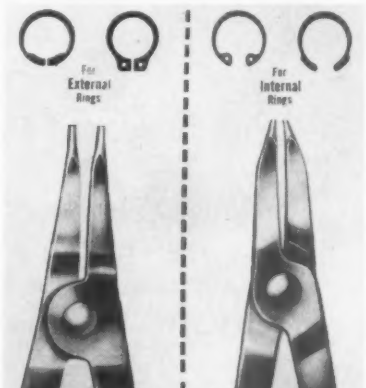
A printed circuit board holder which can be turned to any working position has a holding spread of from zero up to 8½". Where greater widths are to be handled, longer clamp holder rods are available.

The Little Joe No. 160 will flip over to allow working on either side without removal from the holder. A knurled nut permits quick release of the work and an inset design of the clamp holds boards firmly.

MacDonald & Co., 1324 Ethel Ave., Glendale 7, California.

Use postpaid card. Circle No. 21

PERMANENT-TIP PLIERS FOR RETAINING RING ASSEMBLY



Pliers designed for Truarc retaining ring assembly handle rings on shafts up to 4" in diameter and bores from ¼" to 7" in diameter.

Twelve pliers have permanent, ground, hardened tips. Specific pliers are designed for external, some for internal rings. Each plier is designed to handle a specific range of sizes.

Proto Tools, 2209 Sante Fe Ave., Los Angeles 54, Calif.

Use postpaid card. Circle No. 22

AIR SCREWDRIVERS WITH SPEEDS FROM 300-2000 RPM

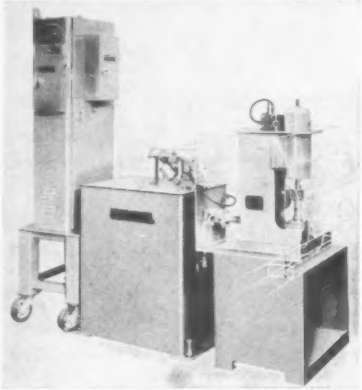
A line of improved Desoutter Brothers air screwdrivers is said to deliver 50% more power than their standard model. Available as either reversible or non-reversible, the tools' speeds range from 300 to 2000 rpm.

The Super-Atom uses standard ¼" shank bits and nutrunners. The tools feature a new system of porting and valve design for maintenance reduction.

Newage Industries, Inc., 222 York Rd., Jenkintown, Pa.

Use postpaid card. Circle No. 23

WELDING ELECTRONIC PARTS IN CONTROLLED ATMOSPHERE



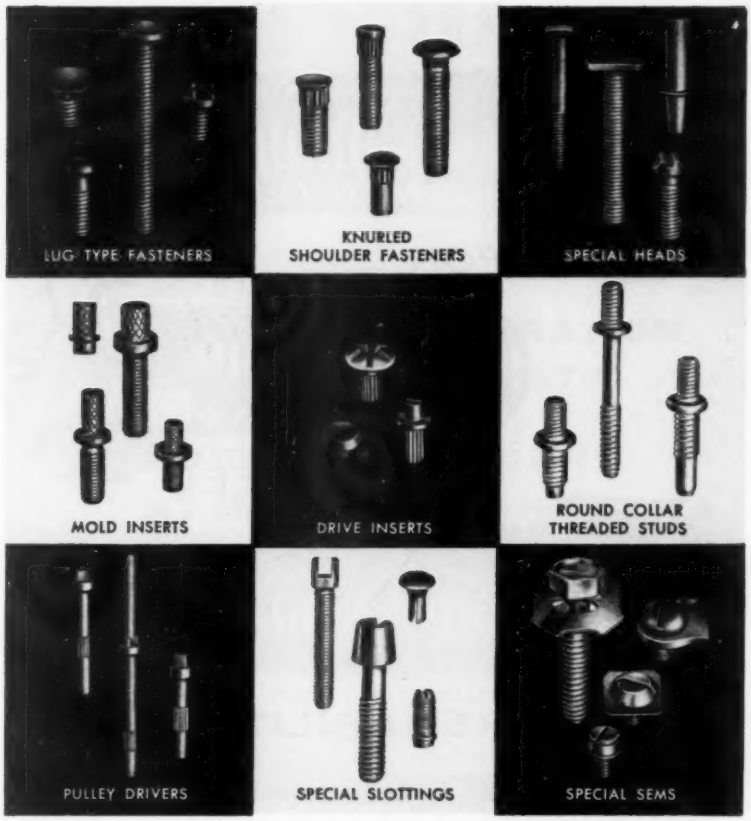
Designed for welding semiconductors and other small electronic parts under controlled atmosphere conditions, the C-type magnetic force welding gun fits easily into standard dry boxes.

All air, water, and electrical supply lines are carried to the electrodes inside a hollow C-frame. This compact design leaves a minimum of area for sealing to dry box walls, and gives a maximum of clearance around the welding area for handling material in and out of the electrodes.

The rugged frame and short throat maintain electrode alignment and surface parallelism. The welder develops 2200 lb. weld pressure and accommodates transistor assemblies having a ring projection diameter up to approximately 1.250".

Precision Welder & Flexopress Corp., 3520 Ibsen Ave., Cincinnati 9, Ohio.

Use postpaid card. Circle No. 24



HUBBELL COLD HEADING

MAKES THEM FASTER AND BETTER

Small fasteners like these Hubbell cold headed parts represent an area of saving often overlooked by management, who give careful attention to the cost and design of major components and little or none to the parts that hold them together. Yet here is the area where savings can be effected most easily and quickly.

Why pay for special tolerances and secondary operations when Hubbell engineers can design and mass produce a cold headed part that is stronger, cheaper and more uniform. For example, all of the above, and thousands more like them, have been specially designed for Hubbell cold heading. And each one helped to make the end product faster and better.

Investigate for yourself. Simply send us a blueprint of the part or a sample for analysis. Our engineers will gladly estimate.

This quality can be your greatest production economy. For standards or specials, call Bridgeport, EDison 3-1181.

IT PAYS TO HAVE HUBBELL GOOD CONNECTIONS

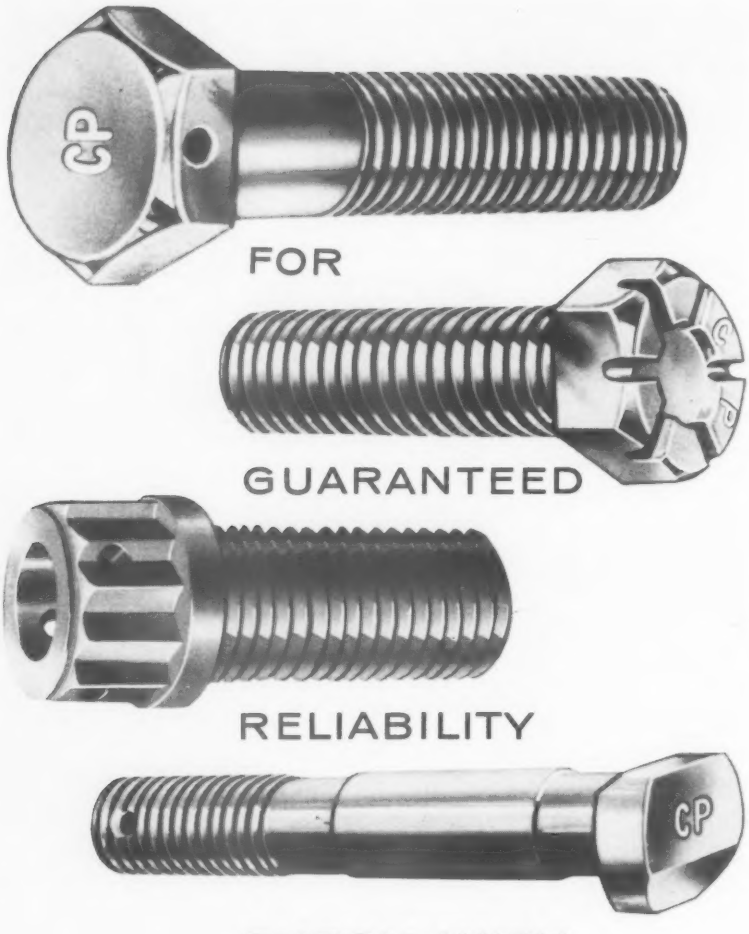
Quality FASTENERS

HARVEY HUBBELL, INCORPORATED

Machine Screw Department, Bridgeport 2, Connecticut

See the Hubbell Fastener Catalog in Sweet's Product Design File 7/Hu.

Use postpaid card. Circle No. 235



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FOR PRECISION CAP SCREWS

You can depend on Chandler for quality, reliability *and service!* Competent Chandler engineers analyze your specific fastening problem . . . follow your order through each stage of production . . . schedule deliveries to meet your requirements. At Chandler, men, materials and machines are efficiently combined in a modern government-approved plant to produce reliable fasteners that meet military and industrial standards. And Chandler's complete laboratory *guarantees reliability* . . . provides chemical and metallurgical control as well as tests of tensile, yield, creep and stress rupture. If you require precision cap screws or bolts, check your Chandler before you place your next order. Send for your Chandler catalog today.

CP **chandler** products corporation
1543 Chardon Road
Cleveland 17, Ohio

8797-CH

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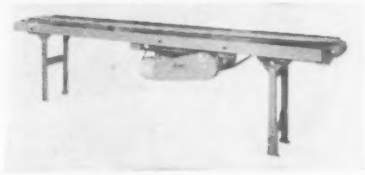
CONVEYORIZED ASSEMBLY TABLES UP TO 75 FEET



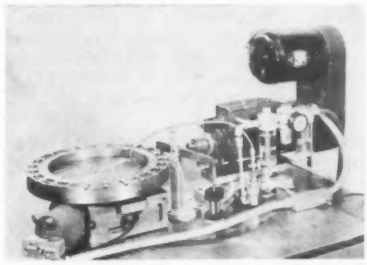
A flat belt conveyor with a table top on adjustable legs can be adapted to practically any conveyor installation. The table top is adjustable transversely so that work can be performed on either or both sides.

The Beltable is available in lengths up to 75', with variable speeds from 5' to 120' per minute in a ratio of 3 to 1, or in several ranges of constant speed.

The Standard Conveyor Co., North St., St. Paul 9, Minnesota.

Use postpaid card. Circle No. 25

ROTARY INDEX TABLE LOCATES TO .001"



A rotary indexing table for positioning work to perform assembly drilling, staking and tapping has a special feature preventing work heads from operating unless index shot pin is in operating position.

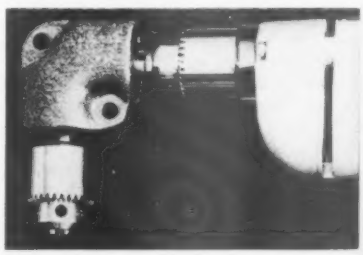
The electronic Roto-Spacer's index plunger locates to .001" of true position repeatedly. Special screws can be inserted in indexes that are not needed, making it possible to work out a desired combination of indexes.

Standard tables have 24 stations. Work holding plates are 12", 15" and 20" in diameter.

M & M Tool & Mfg. Co., 1124 E. 3rd St., Dayton 2, Ohio.

Use postpaid card. Circle No. 26

ANGLE DRIVE WITH HEAVY-DUTY BEARING STRUCTURE



An angle-drive has been developed with heavy-duty bearing for in-plant assembly use without overheating. The case is pre-drilled for mounting bolts

and to provide center holes in dead alignment with the shafts.

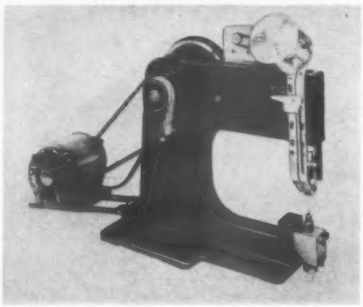
Ball races are ground in the end of the hardened gears to provide both thrust and radial stability.

Specifications include transmission in a 1-to-1 ratio of X 1-1/3 hp at 3000 rpm or 1/3 hp at 750 rpm. It has a maximum speed of 6000 rpm.

Price & Rutzebeck, Box 30, Hayward, California.

Use postpaid card. Circle No. 27

TUBULAR RIVETER DOUBLES AS EYELETTING MACHINE



An automatic, heavy duty, high speed, all-electric riveting machine feeds and sets all kinds of tubular rivets up to 5/16" in diameter and ½" in length. Easily interchangeable feeding tracks and dies convert it into an eyeletting machine as well.

Etco Model 500 has a deep throat and an automatic clutch.

Eyelet Tool Company, Inc., 236 Broadway, Cambridge 39, Mass.

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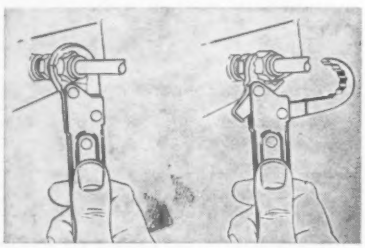
RATCHET WRENCH FOR CLOSE QUARTERS WORK



A lightweight ratchet wrench is designed both for fitting assembly and fastening machine and hex nuts. The Kwik-Tite No. 499-F needs a 30° handle movement to get a new grip.

The tool has hardened chrome-vanadium steel jaws and will not crush light brass or aluminum fittings. It is available in sizes for ⅜" to ⅞" nuts.

The Imperial Brass Mfg. Co., 6300 W. Howard St., Chicago 48, Ill.

Use postpaid card. Circle No. 29

SPOOLED ALUMINUM WIRE

Production capacity for spooled aluminum wire has been tripled with spools of 1 and 10 lbs. available in many types, finishes and sizes.

All-State Welding Alloys Co., Inc., 249-55 Ferris Ave., White Plains, N.Y.

Use postpaid card. Circle No. 30

25 . . . now 8

AUTOMATED FASTENING OPERATION CUTS LABOR COSTS

OVER 60 PER CENT AT INDIANA PLANT

In a well operated Indiana plant allied to the furniture business, you will see a group of eight employees who today have replaced 25 formerly required on the assembling and fastening line. The output is the same while labor cost is over 60 per cent less. This big saving has been accomplished by replacing manual with automatic operation—National Rivets and automated Riveting Machines tooled for the specific job requirements. The result—lowest cost-in-place fastenings.

Pedestal Type Automatic Riveting Machine—each tooled to meet users specific automated job.

MORE PRODUCTION WITH FEWER EMPLOYEES

In spite of the wide use of rivets for assembly purposes, there are still many who have overlooked this means of getting more assembly work accomplished with fewer employees. Have you? Send sample assembly if possible, or a blue print for practical recommendations. You will find that National Automatic Riveting can cut your payroll costs, too.

Write today!

NATIONAL RIVET & MFG. COMPANY
211 MAIN STREET • • • WAUPUN, WIS., U.S.A.

NATIONAL RIVETS
TUBULAR, SPLIT, SOLID ALL METALS

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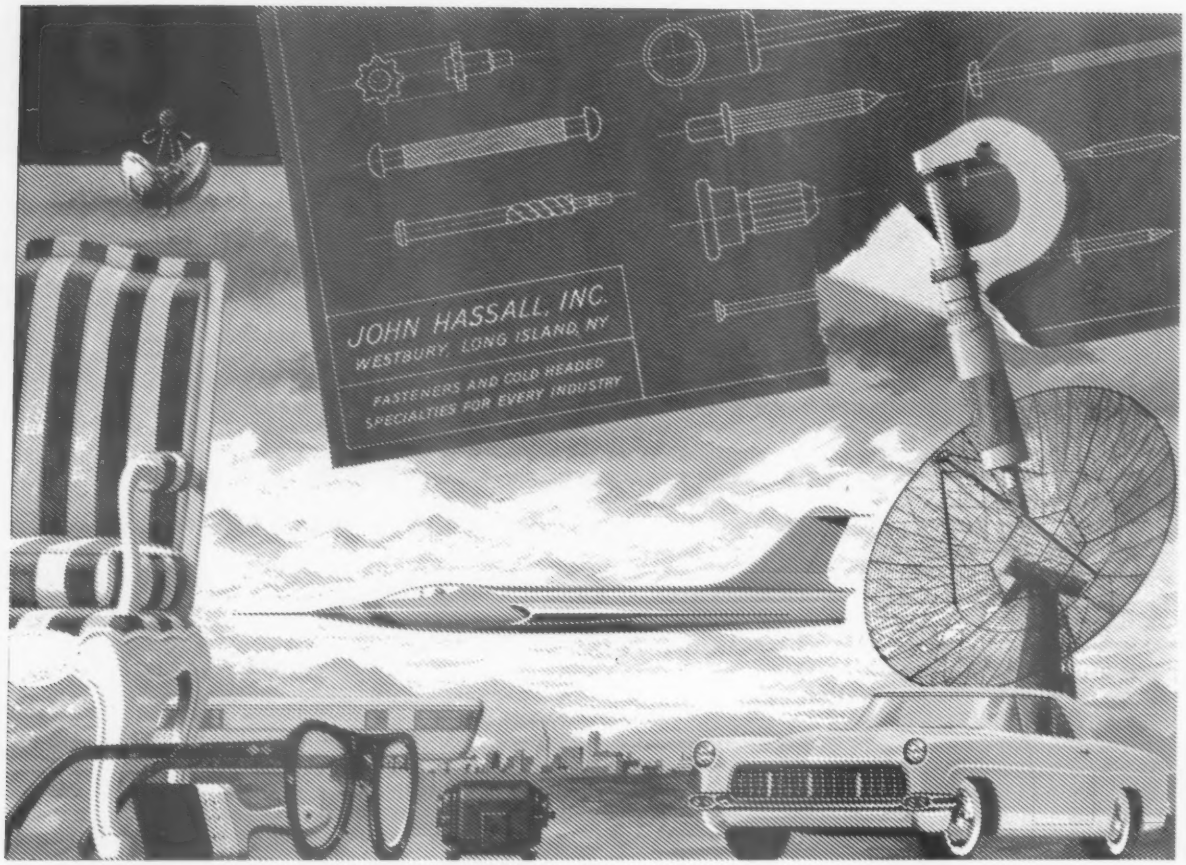

Job-Designed Fasteners for Every Industry

Here is a fast, dependable, low cost, quality minded source of supply for JOB-DESIGNED fasteners of all types, in any metal, to fit your own particular assembly problem. Recognize the fact that a fastener designed specifically to fill a seemingly complex assembly requirement can easily cost less than design modification to accommodate so-called standard rivets. Assembly costs are a very major part of manufacturing expense. Most of this is labor. The fastening medium itself is usually a minimum item. If a Job-Designed fastener makes assembly simpler and faster, permits the use of fewer fasteners, allows the designer functional freedom and improves product efficiency, yours is a purchasing job well done. All these possibilities are available when you come to Hassall for design assistance and quotation on challenging, difficult or unusual rivets, threaded nails, drive screws and other cold headed parts. Short or long runs, pilot quantities, engineering counsel, over 100 years of intimate association with cold heading—and a deep appreciation and regard for the concept of value analysis—all are a part of the Hassall service to you.

MANUFACTURERS SINCE 1850

JOHN HASSALL, INC.

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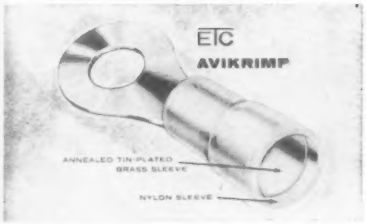
WHAT'S NEW IN FASTENING AND JOINING

For further information on any of the fasteners or methods listed here, use the handy postpaid card opposite page 66.



(See 33)

(See 32)

(See 34)

(See 31)

QUICK-RELEASE PINS WITH BALL LOCKING ELEMENTS

A quick-release pin incorporates 9 four ball-locking elements for increased tension properties. Handles are designed for optimum operational clearance and the oversize quick-release button is anodized bright red for instant identification. The pins are designed for fail-safe operation and continue to be operational even though the handle is accidentally broken.

Lockwell pins are produced in four standard handle configurations and a range of sizes.

Hartwell Aviation Supply, 9035 Venice Blvd., Los Angeles 34, California.

Use postpaid card. Circle No. 31

FUEL CELL LOCKING BOLT RESISTS VIBRATION

A vibration-resistant, self-locking bolt for fuel cell fittings meets MIL-F-18240 and is approved by WADC in accordance with MIL-F-5577B for collapsible fuel cell application.

The bolt incorporates a strip of locking material pressed into a milled slot, and is reusable for a minimum of 15 times without appreciable loss of torque. It eliminates safety wire in both accessible and inaccessible locations.

Long-Lok Corp., 2601 Colorado Ave., Santa Monica, California.

Use postpaid card. Circle No. 32

BRASS SLEEVE REINFORCES TERMINAL, PREVENTS CREEP

Solderless electrical terminals are reinforced by a seamless, annealed, tin-plated brass sleeve permanently attached over the regular terminal barrel. Crimped in the same operation as the barrel, the "skirt" part of the sleeve permanently grips the wire insulation, preventing creep. Any wire flexing takes place away from the crimping point, eliminating the vibration hazard.

The Avikrimp features a permanently attached nylon insulating sleeve which extends beyond the metal support sleeve. No extra insulation is necessary. Operating temperature range: continuous duty from —40°F to 250°F, intermittent duty to 350°F. The sleeve is color-coded for wire range.

The terminals come in all tongue types: ring, hook, spade, flanged spade and rectangular. Stock is available on wire ranges 22-16, 16-14 and 12-10 A.W.G. All standard stud sizes and basic dimensions are available.

ETC Incorporated, 990 E. 67th St., Cleveland 3, Ohio.

Use postpaid card. Circle No. 33

FLUSH-MOUNTING BEAM CLAMP FOR CABLE, PIPE

A clamp secures conduits, switch boxes, pipes, etc. onto any type of building framework requiring lightweight, flush-mounted fastening.

The Junior beam clamp is used with ¾" wide and larger channels, ¼" and/or I-beam members, as well as for other applications. It assures a hidden method of holding pipe and cable above false ceilings.

The Paine Co., 38 Westgate Rd., Addison, Illinois.

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ADD ALUMINUM ALLOY PINS, SLEEVES TO RIVET LINE

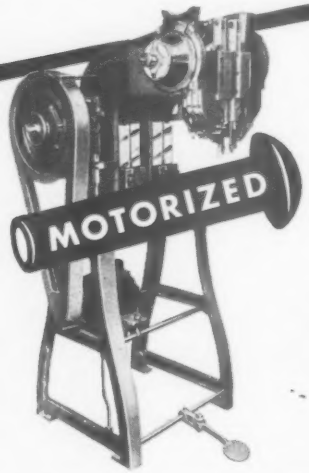
A recently announced line of monel mechanical lock-spindle self-plugging blind rivets has been expanded to include two aluminum alloy designs. MLS fasteners fabricated of 2024-T36 aluminum pins with 2117-T4 or 5056-H14 aluminum sleeves meet specification MIL-W-7986.

The aluminum fasteners are available in either protruding or countersunk head styles and in the same sizes as the monel design (1/8", 5/32" and 3/16" nominal diameter). Grip ranges (1/16" increments) are broad. Each size is available in a variety of grip lengths.

Minimum ultimate shear strengths for the new aluminum MLS rivets (driven) are as follows: 1/8" diameter—430 lb; 5/32" diameter—675 lb; and 3/16" diameter—980 lb. Minimum ultimate tensile strengths for the aluminum fasteners (driven) are as follows: 1/8" diameter—276 lb; 5/32" diameter—417 lb.; and 3/16" diameter—608 lb.

Why *Chicago Rivet* Offers TWO METHODS for Clinching Semi-Tubular Rivets

It is part of a widening service based upon industry's recognition that an assembly held together by semi-tubular rivets has great inherent strength and is usually lowest in production cost.



The Chicago Rivet MOTORIZED AUTOMATIC RIVET SETTER produces a sharp, solid blow that immediately upsets the tubular section. This method is used on 95% of all applications involving metals or non-fragile materials.

The Chicago Rivet AIRPOWERED RIVETER produces a cushioned, shock-free clinch on a tubular rivet, permitting riveting of fragile and uneven materials. This method has greatly widened the use of semi-tubular rivets.

FOR YOUR FILES

RIVET CATALOG describes 1388 standard tubular and split rivets and 25 single and multiple motorized automatic rivet setters.

AIR-POWERED RIVETING catalog contains description and specifications of 8 single and multiple riveters—also rivet setters designed for automated operation.

Why not let Chicago Rivet Fastening Engineers tell you which system is best for you. No obligation.

MOTORIZED

Line includes automatic single, multiple and automated setters.

AIR-POWERED

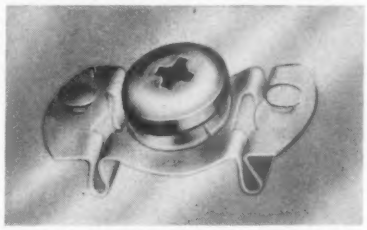
Line includes automatic single, multiple and automated setters.

Chicago Rivet
& MACHINE CO.
946 So. 25th Ave., Bellwood, Ill.
(Chicago Suburb) Branch Factory:
Tyrone, Pa.

Use postpaid card. Circle No. 240

Huck Mfg. Co., 2480 Bellevue Ave., Detroit 7, Michigan.
Use postpaid card. Circle No. 35

MINIATURE QUARTER-TURN FASTENERS SAVE WEIGHT



Miniature quarter-turn fasteners measure .812" by .375" overall and have a thickness of .012". Lion fasteners offer space and weight advantages, tolerate misalignment.

Six stud lengths accommodate total thickness (both sheets) of .040" minimum to .159" maximum. The parts are made of cadmium-plated steel.

Southco Division, South Chester Corp., Lester, Pa.
Use postpaid card. Circle No. 36

SMALL-LOT PACKAGING OF RETAINING RINGS

A new method of packaging and distributing small-lot quantities of retaining rings will make the rings available in Snap-Pak resealable envelopes uniformly priced at $1.00 each.

Each Snap-Pak envelope will contain a single ring type and size. Quantities will range from 2 to 35 rings per pack. A safety fold under the flap prevents small rings from working out of the envelope and helps keeps the contents dust-free. To prevent corrosion, only cadmium plated rings with a dichromate-dip finish will be used, except for certain ring sizes which are manufactured only of beryllium copper.

All Snap-Pak envelopes will be labeled clearly to show the Truarc ring series and size number, ring type and application, metal code and finish and the number of pieces included. Dimensions of the envelopes are 3½" x 4".

Waldes Kohinoor, Inc., 47-16 Austel Place, Long Island City 1, N.Y.
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assembly & fastener engineering

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(Not valid after May 31, 1960)

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Products Manufactured ..... Approx. No. Plant Employees .....

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EDITORIAL ITEMS

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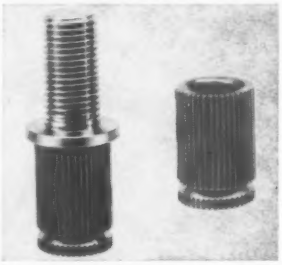
PUSH-IN STUDS, INSERTS ARE SELF-LOCKING



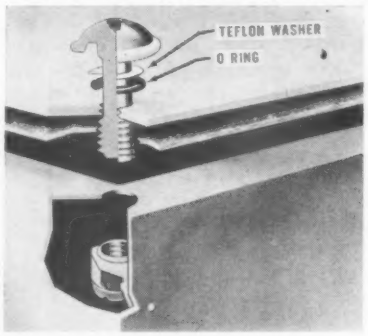
Push-in type brass and aluminum inserts and brass studs when pressed into molded or drilled holes will lock in one operation.

The straight knurled Push-Lock fasteners will not rotate when installed and have a spreader which prevents them from pulling out. They are designed for soft metals, wood and plastic parts. Standard sizes range from 2-56 through 10-32.

Fastener Products, Inc., 349 Connecticut Ave., Norwalk, Conn.

Use postpaid card. Circle No. 38

CAPTIVE SEALING SCREWS FOR COVERS, PANELS, CASES



A new type of pressure-tight, captive self-sealing screws for unlimited reusability on pressurized covers, panels, and cases, have been developed.

Nestled in a groove in the head of the Uniseal screws are any of a choice of the number of Mil Spec-O-Rings, lubricated to prevent inadvertent galling or cutting, by a thin Teflon washer. Metal to metal contact is maintained at all times, assuring the user of maximum tension, as well as a leakproof seal against the widest variety of medias, temperatures, and pressures.

Special metals, sealants, configurations, and drives are also available.

Aero Bolt & Screw Co., 1071 W. Arbor Vitae, Inglewood, California.

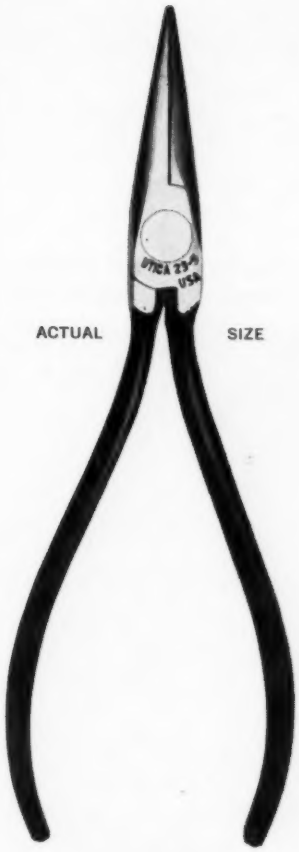
Use postpaid card. Circle No. 39

ASSIGN AIRCRAFT STANDARD TO NYLON FLIP GROMMET

New developments in grommet safety and installation have been recognized in assigning an Aircraft Industry standard, NAS 1368, to the WSI Flip Grommet.

Named from its installation method, the one-piece, solid, nylon Flip Grom-

UTICA®



ACTUAL SIZE

NEW MIDGET CHAIN NOSE!

Specially designed for delicate electronic subminiature assembly, this new Utica plier is the first tool of its size and kind. Developed at the request of professionals in the electronic industry, it's a precision instrument offering the thinnest nose possible consistent with good tool design. Strong, well balanced, finely finished, it's available in 4″, 4½″ and 5″ sizes. Call your Utica distributor or write for complete information.

Utica Drop Forge & Tool Division, Kelsey-Hayes Company, Utica 4, N. Y.

tools the experts use!

Use postpaid card. Circle No. 241

met is merely inserted and then flanged over. No heat is needed. Each size, from 3/16" to 2½" diameter fits sheet gauges from .025" to .250" in four basic lengths. Temperature range is from 65°F to 300°F; maximum limits are 200°F for 60,000 hours, 240°F for 12,000 hours, and 300°F for 2,000 hours of service life.

Western Sky Industries, 21301 Cloud Way, Hayward, California.

Use postpaid card. Circle No. 40

HIGH-TEMPERATURE SHOCK AND VIBRATION ISOLATORS

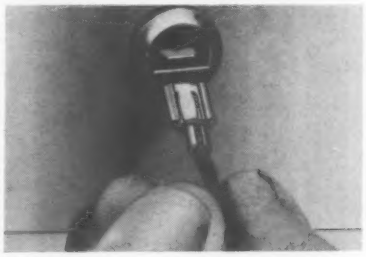
A line of stock and vibration isolators, for use at temperatures up to 500° F, consists of two load carrying springs, mounted in opposed positions, with a built-in damper assembly to restrict resonant buildup. The diameters of the springs, the wire diameter, the assembled length, the number of turns of wire in the spring, and the helix angle of the spring are so controlled as to provide the desired spring rates in directions parallel to and perpendicular to the axis of the isolator.

These mounts can restrict maximum resonant buildups in the low-frequency range to well below 3½ to 1 in any direction of vibration without sacrificing high-frequency isolation efficiency. The units can be furnished with equal spring rates in all directions.

MB Electronics, Box 1825, New Haven 8, Connecticut.

Use postpaid card. Circle No. 41

NYLON TERMINAL BUSHING OFFERS SNAP-IN-ACCESS



A miniature nylon receptacle offers quick-connect access through housings without "pig-tail" wire leads or screw terminals.

The Heyco junction terminal bushing features snap-in assembly of bushing into panel and snap-in assembly of the terminal into the bushing. Three types of brass terminals available are solder, crimp and double disconnect. The bushing used with standard 3/16" female terminals. It is available in colors.

Heyman Mfg. Co., 1000 Michigan Ave., Kenilworth, New Jersey.

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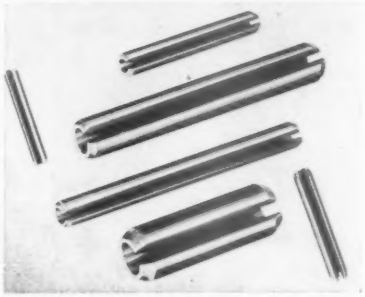
SPRING STEEL HOLLOW PIN FASTENS UNDER TENSION



A pressure-fitting tension pin compresses as it is driven into a slightly undersized hole for a secure and vibration-resisting fit.

The hollow fastener, with a longitudinal slot, is 40% lighter than a solid pin and is made from spring steel. Machined chamfered ends simplify insertion.

Tension pins are available in nominal diameters from 1/16" to ½" and up, in lengths as specified. Two pins can be combined (one inside the other) where there is extra high shear stress or heavy shock load. For such applications slots are arranged 90° or 180° apart.

John Gillen Co., 2540 S. 50th St., Cicero 50, Illinois.

Use postpaid card. Circle No. 43

New One-Piece "Conelok" *with prevailing torque*

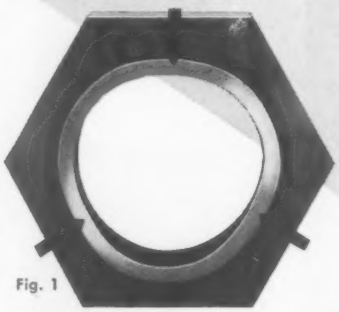


Fig. 1

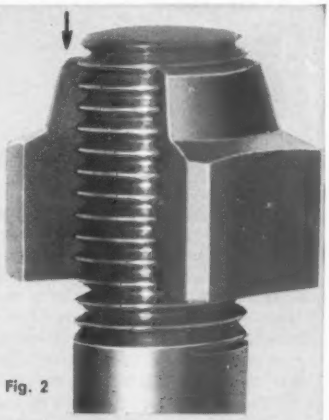


Fig. 2

Three sectors of the tapered portion of the CONELOK nut are preformed inwardly (Fig. 1). When the Nut is applied to a bolt, these conforming sectors are elastically returned to a circular configuration and create an inward and downward pressure which produces intimate contact between the load carrying flanks of the nut and bolt threads (Fig. 2). The shape of the cone sector displacement insures conformity with the mating bolt and maximum friction contact area. . . . The closed stress path in the locking portion of the nut and the advantageous distribution of locking pressure, produce a locking device of high fatigue life . . . and equivalent locking force is exerted at only a fraction of the stress of any slotted type locknut. CONELOK maintains its locking action through many re-applications. . . . It is adaptable to high, and low torque assemblies . . . to high torque stop-nut applications . . . and may be obtained in sizes from No. 10 through 1½", Full and Thick dimensions are "Standard". . .

Send for brochure which includes complete engineering specifications.

NMP

NATIONAL MACHINE PRODUCTS COMPANY

an SPS company 44250 UTICA ROAD UTICA, MICHIGAN

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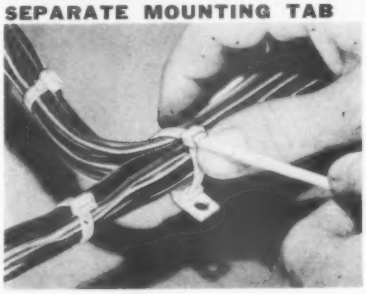
WIRE BUNDLING CLAMP ADDS SEPARATE MOUNTING TAB



A nylon clamp for bundling wire, cable, tubing or hose has been designed with a separate mounting tab.

Because it is not an integral part of the band clamp, the tab can be eliminated at points along the harness where it is not required. At support points it can be pre-mounted to simplify assembly.

The Wedge Lock clamp has ratchet teeth on the band which engage with matching teeth inside the clamp loop. The two-position, floating wedge is notched and can be engaged with a rib on the inside of the loop to provide a permanent lock.

Weckesser Co., Dept AE-3, 5701 Northwest Hwy., Chicago 46, Illinois.

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CAPTIVE WASHER NUT CUTS ELECTRONIC HAZARDS

Short circuits and other electronic hazards caused by loose washers lost during assembly are eliminated by captive washer nut. Both the nut and its integrated, free-turning washer together weigh one-half to one-third as much as old style AN365, NAS679, and MS20365 fasteners of identical size without washers.

Service temperature of the Kaylock H19320 is 800° F. An identical configuration, the Kaylock H19343, is made for 500°F. service. Both fasteners meet MIL-N-25027 requirements. Thread sizes: 2-56 through 10-32.

Kaynar Mfg. Co., Inc., Box 2001, Terminal Annex, Los Angeles 54, Calif.

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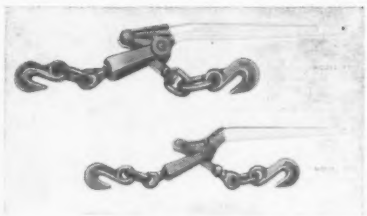
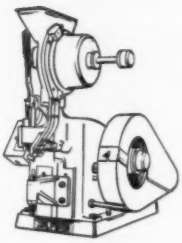
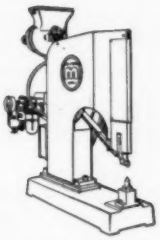
DROP FORGED LOAD BINDERS ARE HEAT TREATED



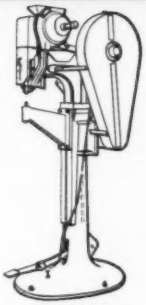
A line of drop forged load binders have been heat treated before assembly to assure extra safety in load trans-



Model 52-S-55



Model 56



Model 250

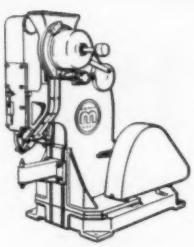
MILFORD'S FLEXIBLE RIVETER LINE CAN HELP CUT YOUR ASSEMBLY COSTS

Bench or Pedestal Models
Mechanical or Pneumatic Operation
Single or Multiple Spindle

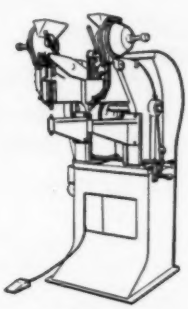
Milford adapts to your production line with a wide range of automatic riveters designed to cut assembly costs. Count on Milford's versatility to come up with the answers you need at substantial cost savings over other fastening methods.

Milford's MANUAL OF RIVETING PRACTICE may have the answers to your riveting and assembly problems. Ask your Milford Representative to show you how to use the ideas in this manual to cut production costs.

Model 423



Model 53



Model 72

THE MILFORD RIVET & MACHINE CO.

MILFORD, CONNECTICUT • NORWALK, CALIFORNIA
ELYRIA, OHIO • AURORA, ILLINOIS • HATBORO, PA

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port and manual operation. Six models are available.

Canton Mfg. Co., 2459 13th St., N.E., Canton 5, Ohio.

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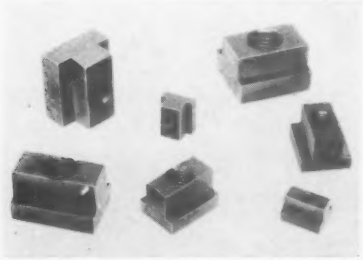
T-NUT SAFETY STOP ELIMINATES TABLE DAMAGE



A device for T nuts prevents studs from turning through to damage machine tables. The device is a built-in safety stop formed through a special thread treatment that blocks the stud at maximum depth.

The T-nuts are made of specially rolled 4150 steel, heat treated for tensile strength of 170,000 p.s.i. (min.) and machined to fit any table slot. Stock size ranges of threads run from 3/8"-16 to 7/8"-9; over-all height, 5/8" to 1¼"; width, 1" to 2" and depth 7/8" to 1¾".

Jergens Tool Specialty Co., 712 E. 163rd St., Cleveland 10, Ohio.

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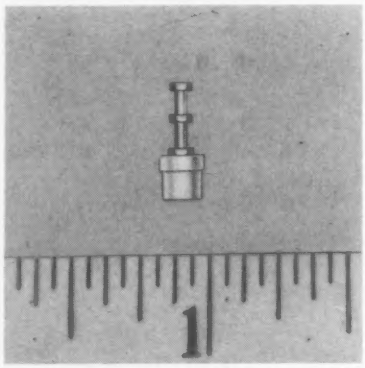
DOUBLE-TURRET, TEFLON PRESS-FIT TERMINAL



A double-turret, teflon press-fit terminal has been added to a line of insulated terminals.

Cambion No. 2610 is designed to press fit into hole .136" ±.002" in diameter in panels from 1/32" to 1/8" in thickness. It is ideal for use wherever conditions of extreme humidity and low capacity to ground are encountered.

Two over-all lengths are available: No. 2610-6 is .325" with greatest spacing between top and middle turrets; No. 2610-7 is .365" with turrets spaced equidistantly. Terminals are brass per QQ-B-626a.

Cambridge Thermionic Corp., 445 Concord Ave., Cambridge 38, Mass.

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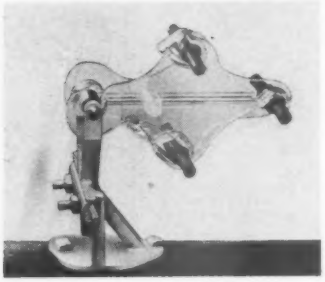
MALLEABLE IRON SPACER TYPE AERIAL CABLE CLAMP



A space type cable clamp assembly, providing a messenger diameter range from 5/16" to 5/8", consists of a pole plate spacer unit which permits attaching the messenger and cable spacer 4½" and 9¼" respectively from the pole surface.

A curved pole contacting surface of large area provides stability of the spacer unit when mounted on the pole. Smooth grooves with belled openings eliminate messenger damage. An extra groove is cast into the spacer body to accommodate an optional pole ground wire. Spacer unit and clamping plate are tough malleable iron castings, hot dip galvanized.

Malleable Iron Fittings Co., Branford, Connecticut.

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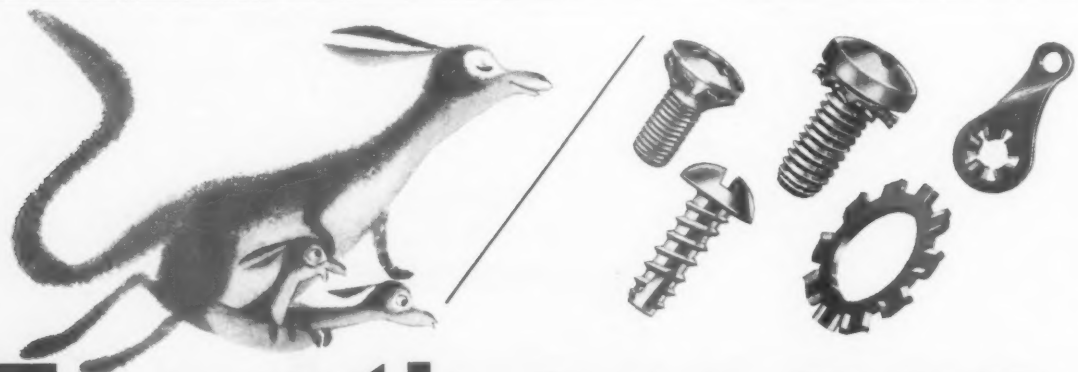

Togetherness

matters with industrial fasteners, too!

Togetherness, industrial style, has a special meaning at Thompson-Bremer because we are one of the few fully integrated manufacturers of Sems, lock washers, thread-cutting screws, terminals and cold-headed specialties. With our engineering services and components manufacturing together under one roof, we can give you faster, more individualized service at competitive prices. We'll bid on your specials requirements, or fill orders for standard items on short notice from the extensive line of EVERLOCK products stocked by your local distributor.

If you buy or specify industrial fasteners, you want whatever your company assembles to go together economically and stay together reliably. Send for catalog and samples or call your EVERLOCK representative.

AMF Everlock INDUSTRIAL FASTENERS

Thompson-Bremer & Co. Division of American Machine & Foundry Company

Thompson-Bremer & Co., Dept. 20
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City_____Zone_____State_____

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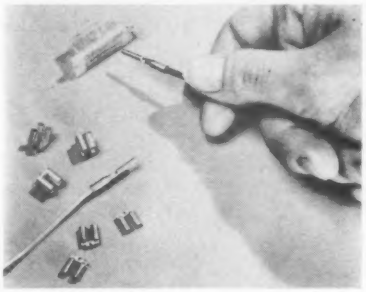
AUTOMATIC DIE CAST ZINC TAPER PIN CONNECTORS



Automatic die casting of zinc taper pin connectors for electronic and electrical applications offers design flexibility and manufacturing economy.

Units may be produced in complex shapes, thin cross sections, close tolerances and in large volume. Typical designs produced are double receptacles which allow connections to be made from either end; parts cast with predetermined breaking points to enable use with any combination wiring scheme; parts cast with rivet lugs for mounting without separate fasteners; integrally cast bosses.

Gries Reproducer Corp., 15 Second St., New Rochelle, N.Y.

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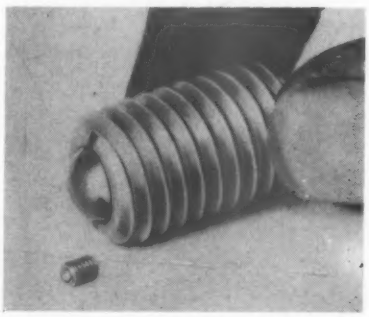
MINIATURE BALL PLUNGERS ADDED AS STANDARDS



Two new miniature sizes have been added to a line of ball plungers as standards. The new sizes, 10-32 and ¼-20 are made of type 440 hardened stainless steel.

Ball Plungers are now available in six standard sizes and 18 end pressures. Specials can be furnished as small as 8-36, 6-40 and 4-48. Bodies can be furnished in either black oxide, cadmium or gold plating.

Vlier Engineering Corp., 8900 Santa Monica Blvd., Los Angeles 46, Calif.

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SILVER SOLDER RINGS FOR HIGH TEMPERATURE JOINING

A line of precision silver solder preform rings is designed for high speed soldering at temperatures ranging from 1150° to 1800°F.

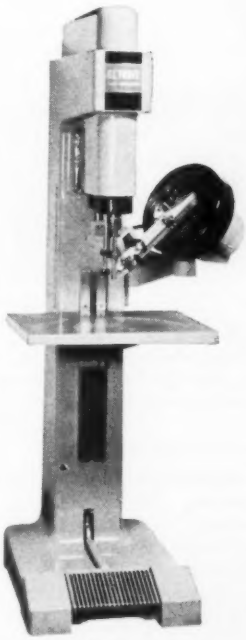
Rings can be supplied with an overlap, a gap or with ends butted in diameters from .003 to .375" and with an

How many ➡ what's your guess?

Screws are #8-32 x ½ inch long.

One man can drive them in one hour

with a DPS power screwdriving machine



The new DPS Model U screwdriving machine.

Why sacrifice manpower on so simple yet tedious a job as driving screws? Free skilled hands for more productive work . . . get higher output per happier manhour—with a DPS power screwdriving machine.

To illustrate, one worker can drive the 2,400 screws in the jar above in one hour. And with no more effort than pressing an air-operated foot pedal. Equally important, they're driven through an easily adjustable clutch, designed to hold constant driving torques.

NEW! THE MODEL "U"—At left, meet the great, new DPS Model "U" screwdriving machine—quickly adaptable for fast, clean driving of screws, nuts and studs. New folder contains full data. Write for your copy today. 15,048

DETROIT POWER SCREWDRIVER COMPANY

2815 W. Fort St. Detroit 16, Michigan

A Subsidiary of Link-Belt Company

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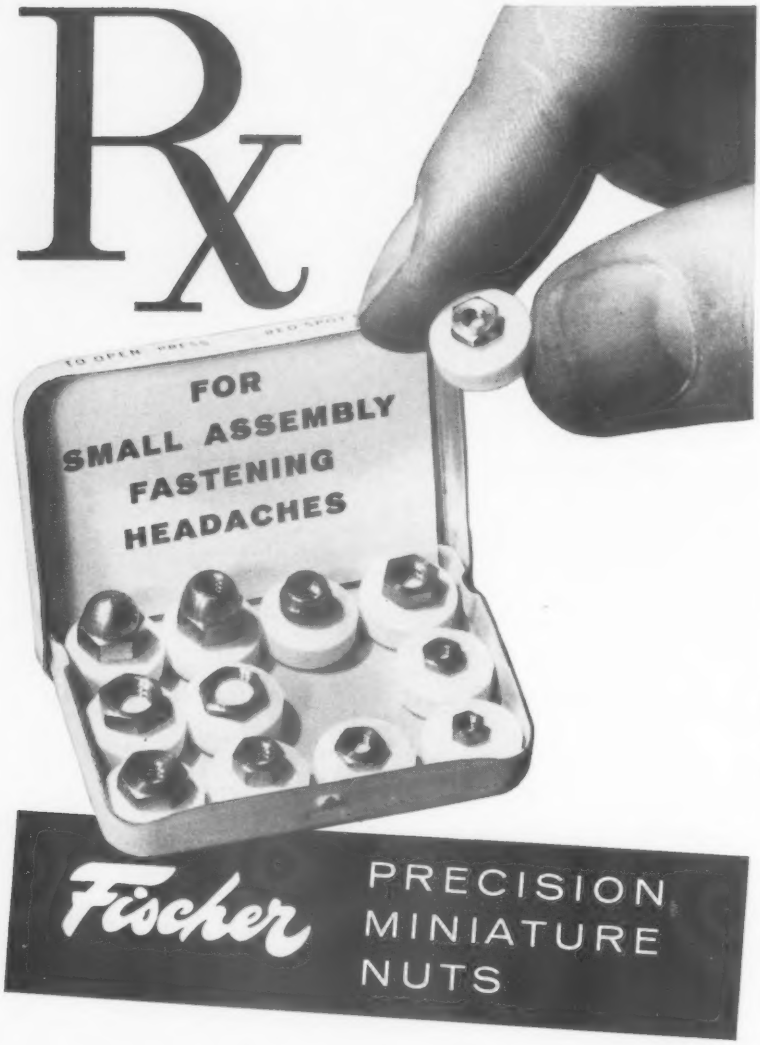

In miniaturized products, fastening delicate components securely in place can be a major production "headache". If the fasteners used are not accurate, uniform and easy to install, assembly operations become a costly nightmare.

To help solve this critical problem, Fischer is supplying precision turned miniature nuts that are tapped square (within 1°) to Class 2 tolerances, with lengths and diameters held to +.000″ and −.005″. Sizes range from ⅛″ hexagon and include standard, special and odd size or shape nuts with standard or special threads from No. "0". In addition, all Fischer nuts are furnished burrless, cleaned and ready to use.

Whatever your application, if you require extreme accuracy and prompt "on schedule" delivery at competitive prices . . . let Fischer quote your next miniature nut order.

WRITE TODAY FOR ADDITIONAL MINIATURE DATA.

there's no premium for precision at

Fischer SPECIAL MFG. CO.

496 MORGAN STREET • CINCINNATI 6, OHIO

8814-FS

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almost unlimited range of inside diameters. The rings consist of a predetermined amount of a specific silver solder alloy. This assures melting at the proper temperature and the correct volume of solder.

Alloys Unlimited, Inc., 20-01 43rd St., Long Island City 1, N.Y.

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ONE-PIECE CAPTIVE CARBON BRUSH HOLDER

A captive holder for carbon brushes can be supplied in various sizes and types, all incorporating cap and holder, and with or without metal inserts. Specified insulating materials, as well as colors, are optional.

The holder was added to a stock line of brush caps, holders, and commutators to meet the requirements of motor manufacturers and assemblers for an economy-type one-piece assembly, or for use where an installation of this type is more practical for design applications. Samples.

Midwest Molding & Mfg. Co., Gurnee. Illinois.

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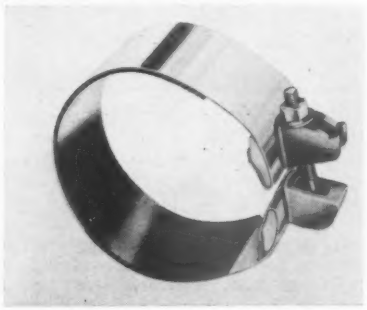
PIPE REPAIR CLAMP IN SIZES ½″ THROUGH 8″



A heavy-duty clamp is designed to repair pipe leaks, either temporarily or permanently.

The new lug design allows the Patchmaster to conform to the contour of the pipe under high torque without biting into the pipe. The pad will withstand high clamping pressures without extruding.

The Marman clamp is available for pipe sizes from ½″ through 8″ and in widths from 3″ to 12″.

Aeroquip Corp., 11214 Exposition Blvd., Los Angeles 64, Calif.

Use postpaid card. Circle No. 54

USEFUL LITERATURE

To receive your copy of any literature reviewed here, use the postpaid card opposite page 66.

ASSEMBLY TABLES

Assembly tables with integral horizontal conveying belts down the center are described and pictured in attractive eight-page Brochure 1050-8. Cross-sectional and nomenclature drawings are accompanied by text and tables giving belt speeds, work area adjustment, support height selection. Photos show typical assembly operations. The Rapids-Standard Co., Inc., Rapistan Bldg., Grand Rapids, Mich.

Use postpaid card. Circle No. 55

ELECTRIC IMPACT WRENCH

Four-page Circular 5284 introduces the latest model in a line of heavy duty electric impact wrenches. The 8U-C 5/8" drive nutrunner has been redesigned for 20% more power than its predecessor. Features are pointed out in text and photos. Specifications given. Ingersoll-Rand, 11 Broadway, New York 4, N.Y.

Use postpaid card. Circle No. 56

PLASTIC GROMMETS

Snap-in nuts for blind applications are available in standard sizes for the first time. Eight-page Catalog AF-6 specifies the plastic parts and shows typical uses. Fastex, Division of Illinois Tool Works, 195 Algonquin Rd., Des Plaines, Illinois.

Use postpaid card. Circle No. 57

WELD FASTENERS

The most complete listing of spot and projection weld fasteners to date is included in 50-page Catalog 60. Nuts, screws, pins and other parts are pictured, specified and shown in dozens of typical applications. Design and production engineering data is given. The Ohio Nut & Bolt Co., 33 First Ave., Berea, Ohio.

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DESIGNING WITH RIVETS

How to design with and purchase rivets is told in a useful 12-page booklet. Five types of rivets are described in detail: when to specify, how each benefits, what dimensions, how best assembled. The question of standard vs. special rivets is treated. Automatic rivet-setting machines are pictured. A special section is included on maximizing purchasing. Judson L. Thomson Mfg. Co., Sawyer Rd., Waltham 54, Massachusetts.

Use postpaid card. Circle No. 59

FASTENER FACILITIES

"The New Pheoll" introduces engineering, production and service facilities available to fastener users. Cold-heading operations, research, design and inventory departments are pictured and sketched in a 16-page brochure. Pheoll Mfg. Co., Inc., 5700 W. Roosevelt Rd., Chicago 50, Ill.

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RIVET SELECTION CHART

A slide chart gives complete specifications for three basic tubular rivets. Schematic design charts for truss, oval and countersunk head rivets include part numbers, grip, clinch allowance, length, diameter and recommended hole sizes. Townsend Co., Box 71-Z, Ellwood City, Pennsylvania.

Use postpaid card. Circle No. 61

RATCHET WRENCHES

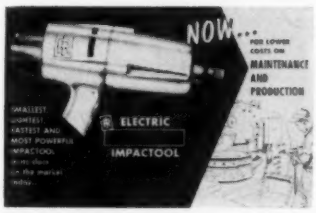
A simplified method for figuring correct wrench size for any bolt and nut diameter is included in 12-page Catalog 62. A line of reversible ratchet wrenches, including the new ½" square drive socket sets and the 10-point sizes, is specified. Lowell Wrench Co., 54 Commercial St., Worcester 4, Mass.

Use postpaid card. Circle No. 62

METAL CLEANING GUIDE

"Your Guide to Effective, Economical Metal Cleaning," a series of charts in file-holder form, simplifies the selecting of correct cleaning method and chemical for the various metals and soils likely to be encountered in metalworking and finishing. It covers typical problems involved in soak cleaning, steam gun cleaning, spray washing

(See 55)



(See 56)

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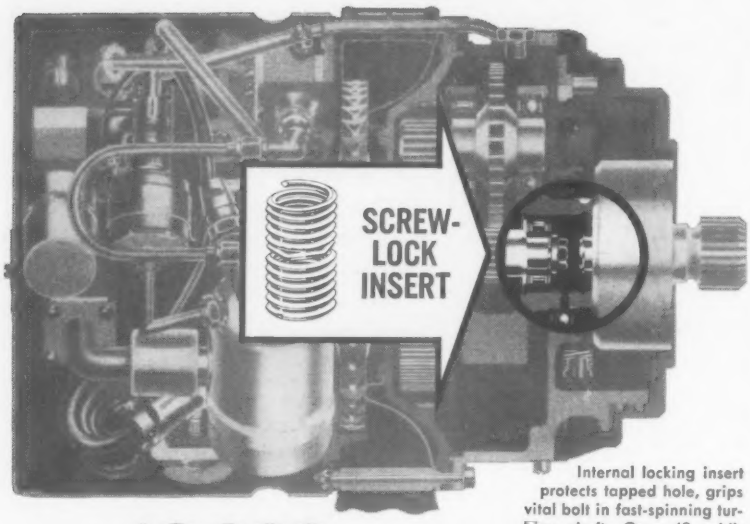


Internal locking insert protects tapped hole, grips vital bolt in fast-spinning turbine shaft. Over 40 additional *Heli-Coil* Inserts insure threaded fastener security throughout the starter.

at 46,000 R.P.M.

HELI-COIL®

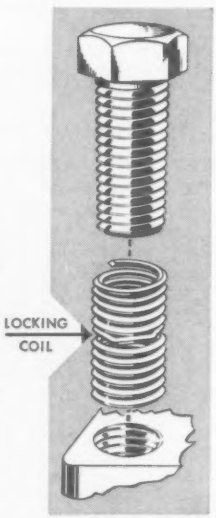
SCREW-LOCK INSERT*

holds this vital bolt fast

...Without Lock Washers or Lock Wiring!

Even when the turbine shaft of General Electric's new AS-18 turbostarter whirls at 46,000 rpm... the key bolt at the end of the shaft can't work or wear loose. General Electric puts a one-piece, *internal locking Heli-Coil* Screw-Lock Insert in this tapped hole, gets thread security in this important threaded assembly despite vibration met at high shaft speeds.

In addition to the critical shaft application, General Electric uses more than 40 of these *Heli-Coil* stainless steel wire inserts throughout this compact 165 hp starter for aircraft gas turbines. Production and performance benefits? Unshakeable fastener security *without* the use of clumsy, heavy lock nuts, lock washers and lock wiring... lighter weight... less installation cost... faster and easier assembly and disassembly of this tiny power pack that weighs only 46 pounds! *Patented



Principle of *Heli-Coil* Screw-Lock Insert. Locking center coil grips screw in tapped hole; holds screw firmly against vibration and impact.

***Heli-Coil* Screw-Lock Inserts**

- positively lock screws and bolts against loosening under impact and vibration
- prevent thread wear, stripping, corrosion, galling and seizing
- eliminate lock nuts, lock wiring, other supplementary locking devices
- can be used in standard proportion bosses without need for redesign
- are available in a complete range of U.N.C. and U.N.F. thread sizes
- save assembly time, space, weight and cost
- meet military specs for locking torque and vibration

HELI-COIL CORPORATION
DANBURY, CONNECTICUT

HELI-COIL CORPORATION, 3103 Shelter Rock Lane, Danbury, Connecticut
Send complete design data on *Heli-Coil* Screw-Lock Inserts
NAME_____TITLE_____
FIRM_____
ADDRESS_____
CITY_____ZONE____STATE_____ 1772

IN CANADA: Armstrong Beverley Engineering Ltd., 6975 Jeanne Mance St., Montreal 15, Que.

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machine cleaning, and electrocleaning. Magnus Chemical Company, Dept. AFE, South Avenue, Garwood, N.J.

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DESIGNING WITH BUSHINGS

Design information on how to strengthen mechanical fastening and other applications with adjustable wall-thickness bushings is contained in a four-page data sheet and inserts. How to use the bushings to obtain tighter radial fits with bolts; with anti-backlash hinges or pivot pins is described and illustrated. Adjustable Bushing Co., 12036 Vose St., North Hollywood, Calif.

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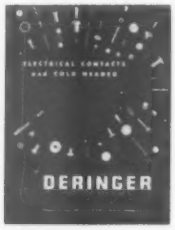

ELECTRICAL CONTACTS

How electrical contacts and rivets can be cold headed for high strength and lower costs is the theme of a four-page bulletin. Contacts are made from silver and other precious metals with typical uses listed. The process of magnetic force spotwelding of assemblies is discussed. Deringer Metallurgical Corp., 8131 Monticello Ave., Skokie, Ill.

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SPRING LOCK NUTS

Twenty-page Catalog 592 shows a complete line of spring tempered steel lock nuts, including regular hex, integral washer, acorn, wing and adjusting nut types. Details of design and locking principle, advantages, typical applications, dimensions, load ratings, materials and finishes are given. The Palnut Company, 79 L Glen Road, Mountainside, N.J.

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TORQUE TOOLS

Torque wrenches of several types and torque testers are outlined in a four-page mailing piece. Advantages of each tool are described and charted. Tables list torque requirements for bolts from No. 0 to 1½ and torque conversion values from ft.-lbs. to in.-lbs. and reverse. Jo-Line Tools, Inc., 8442 Otis St., South Gate, Calif.

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ADHESIVE APPLICATOR

An adhesive applicator that feeds solvent and water-based adhesives through a flexible hose directly into a brush under factory air pressure is the subject of a two-page bulletin. The Bostik applicator-model B, its basic parts, and a listing of its advantages over hand brush application of adhesives is described. B. B. Chemical Company, 784 Memorial Drive, Cambridge, Massachusetts.

Use postpaid card. Circle No. 68

ANODIZING ALUMINUM

What is the cost of anodizing aluminum? Can anodized parts be formed? How much heat can anodic films withstand? Does anodizing change the dimension of a part? Answers are found in an eight-page booklet, "Questions and Answers about Anodizing." Letterhead request. Reynolds Metals Company, Dept. AFE 26, Richmond 18, Virginia.

Use postpaid card. Circle No. 69

QUICK-RELEASE FASTENERS

Quarter-turn fasteners are divided into four lines for quick and clear explanation. A six-page bulletin pictures and describes each component part of the fastener and gives its industry uses. The standard, supersonic, universal and panel types are included. Dzus Fastener Co., Inc., 125 Union St., West Islip, N.Y.

Use postpaid card. Circle No. 70

INDEXING UNITS

Builders and users of automatic assembly equipment will be interested in standard automatic cam-operated indexing units. Four-page Bulletin 12B gives dimensional data on three types, shows a typical unit in cross-section and describes a typical assembly operation. Standard Tool & Mfg. Co., Kearny, New Jersey.

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ALUMINUM LOCK NUT

Self-locking action and other features of the Tru-Lok nut are described in Bulletin 3002. The aluminum fastener has a spring temper stainless steel wire form within an aluminum body. Dimensions are listed for coarse and fine thread series. Waltham Precision Instrument Co., 221 Crescent St., Waltham 54, Massachusetts.

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BLIND EXPANSION RIVETS

DuPont's aircraft explosive rivet for blind applications is explained in a four-page bulletin. Various head types available, dimensions, nomenclature and new developments in the field are included. Illustrated. The Bowman Products Co., 850 E. 72nd St., Cleveland, Ohio.

Use postpaid card. Circle No. 73

ENGINE NUTS

Engine nuts made of special metals for elevated (+1400°F) and sub-zero (—350°F) temperatures is the subject of a 50-page catalog. Sections are devoted to hex, anchor, shank, gang channel and special nuts. Other sections dis-

Are you designing to series 60 standards? If so, specify Bristol.

This DOUBLE-DIAMOND knurl marks the BRISTOL "Series '60"

. . . the cap screw that holds more . . . indents less . . . wrenches tighter than ever before . . . meets or exceeds all new "Series 1960" standards of Socket Screw Manufacturers' Committee. Of course, regular Bristol "Series 1936" standard screws are still available in hex or Bristol Multiple-Spline.

Precision socket screw manufacturers since 1913

*Made in sizes as small as No. 0 in Alloy Steel and Stainless Steel. Cap screws up to 1½" diameter.

THE BRISTOL COMPANY Socket Screw Division Waterbury 20, Conn.

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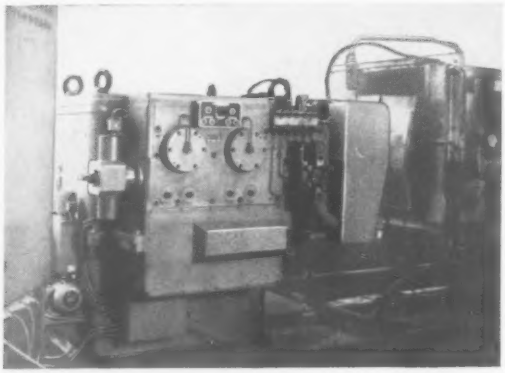
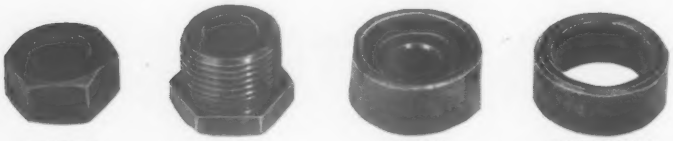
New HOTMASTER

Automatic Hot Forming Press . . .





STANDARD NUT | PIPE REDUCER | CASTER WHEEL | BALL BEARING RING

Designed and built by German craftsmanship whose experience in the hot forming of parts is recognized throughout the world by the bolt industry.

- ★ New, advanced design
- ★ SCALE FREE PRODUCTION of nuts and parts from hot rolled material
- ★ FAST SET-UP TIME
- ★ No royalty payments

MACHINE PRODUCTION

TYPE	MACH. CAP.	NUTS PER MIN.
WSPE 10	1/2" NUTS	Up to 180
WSPE 20	3/4" NUTS	Up to 120
WSPE 30	1-1/4" NUTS	Up to 100
WSPE 50	2" NUTS	Up to 80

Write or Phone ED 1-4858 for details!

SOLD AND SERVICED IN U.S. AND CANADA BY

The BOLTMASTER Co.

Exclusive importers of Peltzer & Ehlers, Krefeld, Germany—builders of machinery for the Bolt Industry since 1888

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cuss the self-locking principle and a chemical analysis and strength comparison of Kaylock engine nut materials. Weight saving, resistance to fatigue, and the availability of special shaped engine nuts and gang channels is discussed. Kaynar Mfg. Co., Inc., Box 2001, Terminal Annex, Los Angeles 54, Calif.

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MOLDED PLASTIC PARTS

New designs, products and production economies through automatic injection molding of Delrin parts is the theme of a four-page bulletin. Performance data, properties, and an illustrated 11-point check list for designing with this acetal resin are included. Gries Reproducer Corp., 400 Beechwood Ave., New Rochelle, N.J.

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750 STOCKED SPRINGS

Over 750 different springs available from stock are listed in a 20-page catalog, which includes specifications and prices. Springs are of the compression and extension types in stainless steel and music wire. Lee Spring Co., Div. of Leetronics, Inc., 30 Main St., Brooklyn, New York.

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FLUSH-SEATING PLUGS

Close dimensional control during manufacturing permits Levl-Seal pressure plugs to seat within a half pitch in pressure systems. Product details are told in Bulletin 2501, with recommendations on tapping and seating torques charted and specifications listed. Standard Pressed Steel Company, Jenkintown, Pennsylvania.

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LOCK NUTS, STUDS

A vibration-resistant lock nut combines a steel threaded retainer pressed into a standard nut body. Literature describes its spring tension fit features and uses. The same principle has been incorporated into a stud. Standard fasteners are pictured and specified. Security Locknut Corp., 1800 N. 15th Ave., Melrose Park, Illinois.

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ELECTRODES

Engineering data on standard resistance welding electrodes and accessories is listed in Catalog 8-69. Ten types of electrodes are specified and drawn dimensionally. A handy chart recommends from 22 types of electrode alloys for welding 22 metals. P. R. Mallory & Co., Inc., Indianapolis 6, Indiana.

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WASHERS

A large stock of washers fabricated in five metals is listed in an eight-page catalog. For quick reference, washer specs are separated by type (flat, split lockwashers, Shakeproof lockwashers) and kind (riveting, S.A.E., etc.) and illustrated. Accurate Threaded Fasteners, Inc., 2901 W. Montrose Ave., Chicago 18, Ill.

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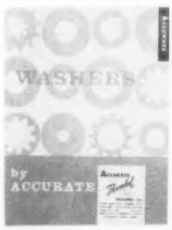

TORQUE WRENCH

Developed for instrumentation and electronics, the Hexco torque wrench is described in a one-page flyer. The wrench, for use with hex screws, is adjustable for 5 to 18 lbs. and is furnished with five interchangeable blades. Herrmann Engineering & Sales Co., 15942 Minnesota St., Paramount, California.

Use postpaid card. Circle No. 81

FURNACE BRAZING

"How and Where to Use Electric-Furnace Brazing," a 50-page handbook rerelease of an all-time best seller on the subject of electric-furnace brazing, covers such subjects as the where and why of furnace brazing, how to remove copper from steel after brazing, application and selection of brazing metal, selection of flux, strength of furnace-brazed parts, how to furnace-braze cast iron and remedies for furnace-brazing ailments. General Electric Co., Schenectady 5, N.Y.

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SEAM WELDERS

Standard seam welders and tooling are presented in a four-page bulletin. Fourteen machines in 50 kva through 400 kva capacities, with an example of the work they were tooled to handle, are pictured and described. Resistance Welder Corp., Bay City, Mich.

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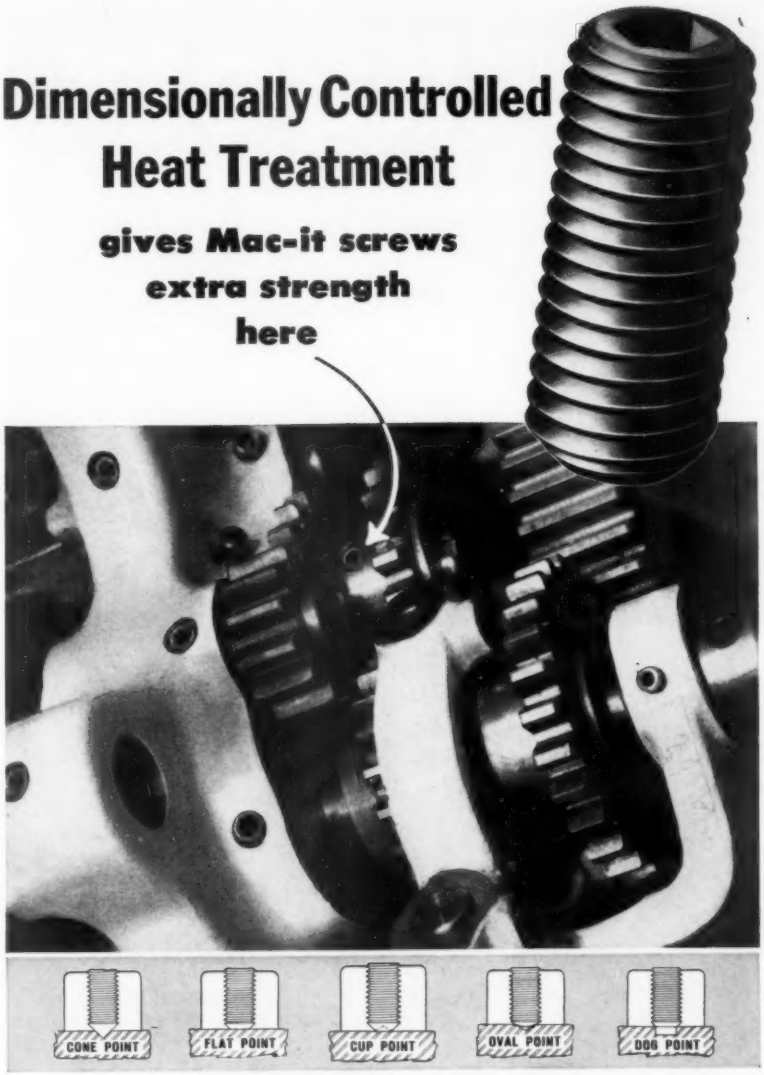
ROTARY RIVET SPINNERS

Noiseless riveting—a method in which rivet heads are formed by two rollers revolving with the spindle and with controlled pressure— is described in a four-page bulletin. Eight floor and

Dimensionally Controlled Heat Treatment

gives Mac-it screws extra strength here



Speed, vibration, stress are tough operating conditions that extra strong, extra resilient Mac-it set screws handle with amazing ease. These high quality screws are made of special pre-tested alloy steel, produced with clean, sharp, fully formed threads and points.

Controlled heat treatments, based on material, physical dimensions and end-use, mean that Mac-it set screws resist upsetting of the points and rounding out or splitting of the hex sockets. This guarantees screws that can be set and re-set again and again with confidence. They are available with cup, flat, cone, oval and dog points so that you can select exactly the style you need.

The interest, skill and care of Mac-it specialists is your assurance that every Mac-it screw will give you the service you want—every time. That's why we say, choose Mac-its . . . *they hold tight in tight places!*

Buy by name from your distributor—buy Mac-it.

Mac-it®

NEW SPECIFICATION SHEET listing new 1960 Series Industry Dimension Standards for socket head cap screws. Write for your *free* copy.

Mac-it Parts Co., Dept. 20, Lancaster, Pa.

MAC-IT ALLOY STEEL SCREWS

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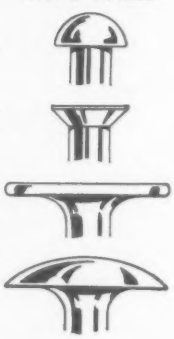
HUCKBOLT®

YOUR BEST FASTENER BUY

INSTALL UP TO 30 PER MINUTE!
• POSITIVE MECHANICAL LOCK.
• EXCELLENT PULL-TOGETHER, HIGH TENSILE PRELOAD.
• HIGH-SHEAR-AND-TENSILE STRENGTH.
• NO LOOSENING OR STRIPPING.
• BROAD BEARING AREAS.
• UNIFORM CLINCH.
• AMPLE GRIP TOLERANCE.
• EASY REMOVAL WITHOUT WORK DAMAGE.
• 3/16" TO 3/4" DIA. GRIPS TO YOUR NEEDS
SAVE UP TO 70% INSTALLED COST!

HEAD STYLES



The versatile Huckbolt fastener can show you worthwhile savings over most other fastening methods.

These modern, efficient fasteners are available in diameters, grips, headstyles and metals to meet your requirements.

Lightweight, easy-operating Huck power or hand tools can install these fasteners with absolute uniformity up to 30 per minute in the hands of one unskilled operator.

Your Huck fastening engineer will gladly help you.

HUCK *MANUFACTURING COMPANY*

2480 Bellevue Ave. • Detroit 7, Mich. • WAlnut 3-4500

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bench riveters, and accessories, are pictured and specified. Capacities are rated to ⅜" diameter for steel rivets, larger for other metals. Linley Brothers Co., 671 State St., Bridgeport 1, Conn.

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MAGNETIC TORQUE TOOL

Permanent repeating torque in range of 1 in.-oz. to 25 ft.-lbs. within 2% accuracy is guaranteed for a new torque tool. The wrench-like device is described in a four-page illustrated brochure. The unit clicks when pre-set torque is reached. Stuart D. Paterson Co., Inc., Box 3544, Rochester 9, N.Y.

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BOLT-RIVET FASTENER

Hi-Lok is a fastener combining the advantages of a nut-and-bolt and a rivet. A 62-page manual details a series of tension-fatigue tests made on the aircraft bolt. Installation data, specification sheets and features are included. Hi-Shear Rivet Tool Co., 2600 W. 247th St., Torrance, Calif.

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PREFORMED CLAMPS

Clamps of all types are pictured and specified in a 16-page indexed catalog. Test results, step-by-step installation drawings, sizes and prices are given for clamps used on hoses, poles, cables and in mounting applications. Band-It Co., 48th & Dahlia St., Denver 16, Colo.

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TORCH BRAZING

Five detailed tips on torch brazing practice are included in four-page Bulletin 81. Four case histories involving silver alloy torch brazing show different advantages of the method in text and photos. Handy & Harman, 82 Fulton St., New York 38, N. Y.

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MACHINED NUTS

Prices for stocked brass and stainless steel machined hex nuts are listed on ring punched data sheets. Prices charted by size and quantity for coarse and fine threaded full and jam nuts. Automatic Screw Machine Products Co., 3425 W. 31st St., Chicago 23, Ill.

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PARTS FEEDERS

Vertical vibratory parts feeders are shown in assembly operations and specified in a 16-page manual-catalog. Various sized bowls, drive units, switches and chutes are catalogued. Design features for feeding different types of parts are included. Syntron Co., Box 220, Homer City, Pa.

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THREADED INSERTS

Standard threaded inserts of aluminum and brass for plastics, rubber and ceramics are illustrated and specified in four technical data sheets. Yardley Precision Products Co., 53 Afton Ave., Yardley, Pennsylvania.

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FLOATING PRESS NUT

Designed for fastening drilled panels with a minimum thickness of .045", a press-in nut has a .030" float. Engineering data sheets are available on the self-locking fastener. Rosan Inc., 2901 West Coast Hwy., Newport Beach, Calif.

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THREADED PIPE FITTINGS

Threaded pipe fittings are treated in a 12-page, two-color catalog. Plugs, bushings, standard and special weldments are pictured and specified by size, type and material. A new bulk packaging system is described. Many head sizes are available. Pittsburgh Plug and Products Corp., Evans City, Pa.

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DRILLING-TAPPING MACHINE

How a 6-spindle turret drilling and tapping machine has cut costs in four different applications is related in a six-page bulletin. Specifications are included; cost comparisons made. Accessory equipment adapts the unit to a wide range of work. Burgmaster Corp., 13226 S. Figueroa St., Gardena, Calif.

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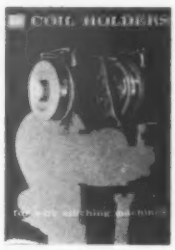

WIRE COIL HOLDERS

Coil holders for wire stitching machines are presented in an illustrated, four-page folder. The uniform-feeding units have a non-tangle, automatic brake. A handy chart finds the number of stitches produced per pound of wire. Acme Steel Co., 135th St. & Perry Ave., Chicago 27, Ill.

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SCREW THREAD FORM

The Hi-Life thread is the subject of a four-page folder. Through the use of photoelastic studies, the literature depicts the change from the old flat-root thread form to controlled thread root form which features a larger and more uniform root radius of concave configuration. Lab test results of cycle life under various stress conditions listed in the new folder show that fatigue life of Unbrako socket head cap screws is up to 100% greater than the life of screws with flat thread roots. Standard Pressed Steel Co., Box 1121, Jenkintown, Pennsylvania.

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NEW Snap-on

MAGNETIC SOCKETS last ten times longer — give re-usable magnet bonus

Cutaway view showing socket, magnet, self-tapping screw. *Snap-on* magnetic sockets are available in the following sizes: ¼-in. drive for ¼, 5/16, 3/8, 7/16-in. sockets; 3/8-in. drive for 5/16, 3/8, 7/16, ½, 9/16-in. sockets; ½-in. drive for 7/16, ½, 9/16-in. sockets.

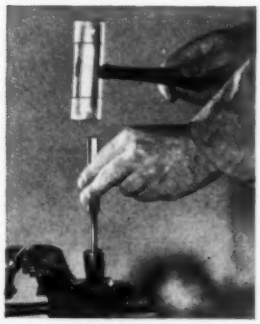
On actual customer test, this newly developed socket drove 112,320 self-tapping screws. A similar competitive socket, priced only about 30 cents less, wore out after driving only 10,530 screws. Both sockets were subjected to identical conditions.

Figure what *you* can save by switching to these new *Snap-on* sockets — in replacement cost — and in assembly line downtime, too.

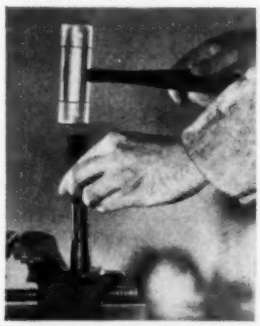
and here's an Extra Bonus . . . re-use your magnets — save up to 50%

In addition to far greater life, this socket is available without the magnet. You simply tap or press the magnet out of the worn-out socket — insert it in the new one. You save 50 percent on the cost of a complete magnet socket. *Snap-on* has developed an inexpensive tool that inserts the magnet to exactly the right depth.

This is an example of *Snap-on* research and development that helps industry save time and money. Your *Snap-on* industrial tool specialist can show you many more. Branch offices and warehouses are conveniently located in 58 major cities throughout the U.S. and Canada.



To remove magnet, simply tap it out of the socket with an appropriate punch.



To re-insert, just tap magnet into socket with *Snap-on* assembly punch. The entire operation takes about a minute.

SNAP-ON TOOLS

FOR ALL INDUSTRY

8033-C 28th Avenue • Kenosha, Wisconsin

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FLUID POWER . . .

- a young industry with a great future
- opportunities unlimited
- trained men needed—always

NOW

the industry's first "On-The-Job" training program

A home study course easy to understand

send for descriptive literature and enrollment-application

The Authors . . . Two of the leading authorities in the country, on hydraulics and pneumatics, developed the studies.

The Course . . . Easy to understand, job-related and written for men working with INSTALLATION, OPERATION, and MAINTENANCE of FLUID POWER EQUIPMENT. Particularly valuable to men in SALES and SERVICE of equipment having hydraulic or pneumatic components.

Mr. Plant Manager *Investigate* the advantages of sponsoring Hitchcock's home-study course for training men to fill responsible positions. You'll benefit through increased production and operation efficiency.

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WHEATON, ILLINOIS

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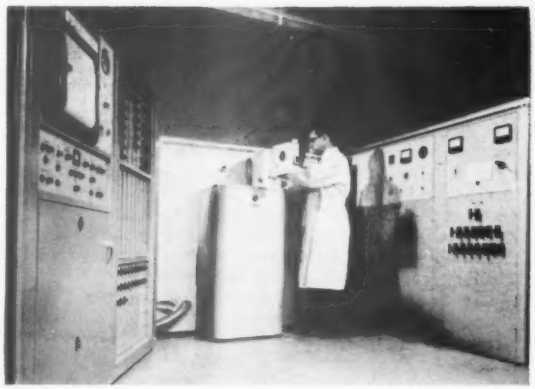
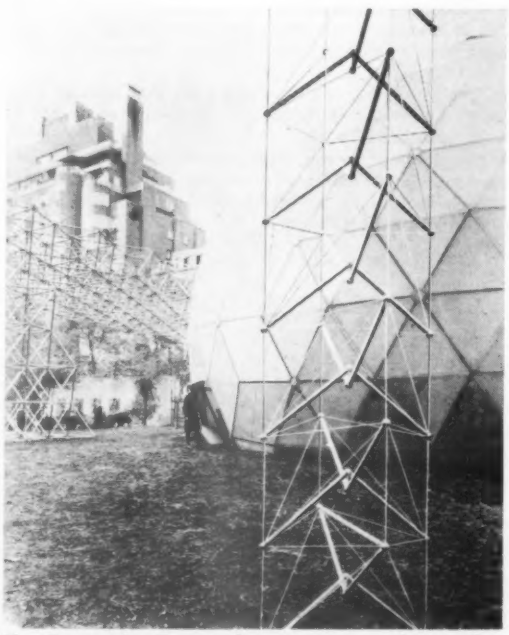
INDUSTRY MAKES NEWS



Harper's new spectograph assures control of chemical analysis of alloys.



The Tensegrity Tower demonstrates a theory that buildings designed to capitalize on steel's tensile strength properties can be far lighter and stronger.

FASTENER SHIPMENTS JUMP IN DECEMBER

December shipments of industrial fasteners climbed to the level attained in the first quarter of 1959, reports the Industrial Fastener Institute in its latest Index to Shipments. The December unadjusted rate rose to 138 from November's 116. The seasonally adjusted figures for the two months were 147 and 115. Shipments for the year were 146, or 146% of the 1947-49 level. This was 17% above the 1958 mark but 10% below 1957.

HARPER INSTALLS METAL SPECTROGRAPH

Installation of one of the most modern metal spectrographs available to primary metal producers was made by the H. M. Harper Company, Morton Grove, Illinois.

Harper, in its Metals Division, uses the Ugine-Sejournet extrusion process (which utilizes molten glass as a lubricant) to produce steel and stainless steel extruded shapes as well as mill products (wire, bar and rod) for Harper's Bolt Division. Harper's new spectrograph, also called an optical-emission-quantometer or direct-reading-spectrograph, assures absolute control of chemical analysis of alloys.

Now, Harper's pipe line of "in process" material is subject to better and more efficient production control since all alloy melts can be verified while they are still in the furnace and remelts of chemically imperfect ingots are totally eliminated.

DESIGN TOWER AROUND AIRCRAFT BOLTS

Twenty high-strength aircraft fasteners made especially for the job by Standard Pressed Steel Company play the key role in an unusual architectural structure.

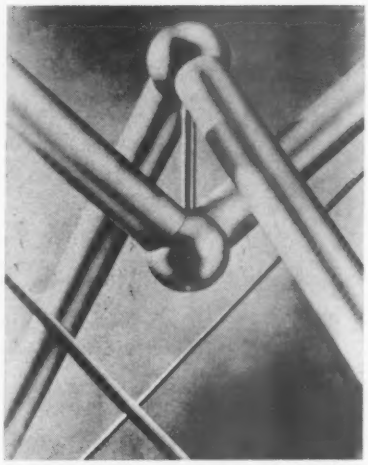
The bolts and mating nuts—rated at 220,000 lbs. psi tensile strength—are used to erect, adjust, and maintain rigidity in the new tensegrity (for tension-integrity) tower designed by Buckminster Fuller.

The structure gives physical form to a startling architectural concept. It shows that buildings—customarily designed around the compressive strength of steel structural members—can be made

continued

to capitalize primarily on steel's vastly improved tensile properties. Result is structure with remarkably improved strength-to-weight ratios.

The experimental tower, for instance, stands 36 feet tall, yet weighs only 85 pounds. In theory, say the builders, Shoji Sadao and Edison Price, Inc., New York, the departure from conventional architectural practice could produce buildings of virtually unlimited dimensions.



Keystone element of the 20 trusses making up the tower is the aircraft bolt which joins the V-shaped aluminum tubes. As the fastener is tightened, pulling the Vs closer, the arms open up to stretch 5/32" wires which are attached to the tube ends.

Structures like a dome over New York City would become practicable says Fuller, since they would actually gain in strength with increasing size.

Currently on display at the Museum of Modern Art in New York City, the tensegrity tower is made up of 20 separate, tetrahedron assemblies. Each of these units is composed of two V-shaped aluminum tubes of one inch diameter. The tubes are joined at their apexes by the SPS Hi Psi aircraft bolts, and separate thin wires of monel metal of 5/32" diameter, which complete the structure.

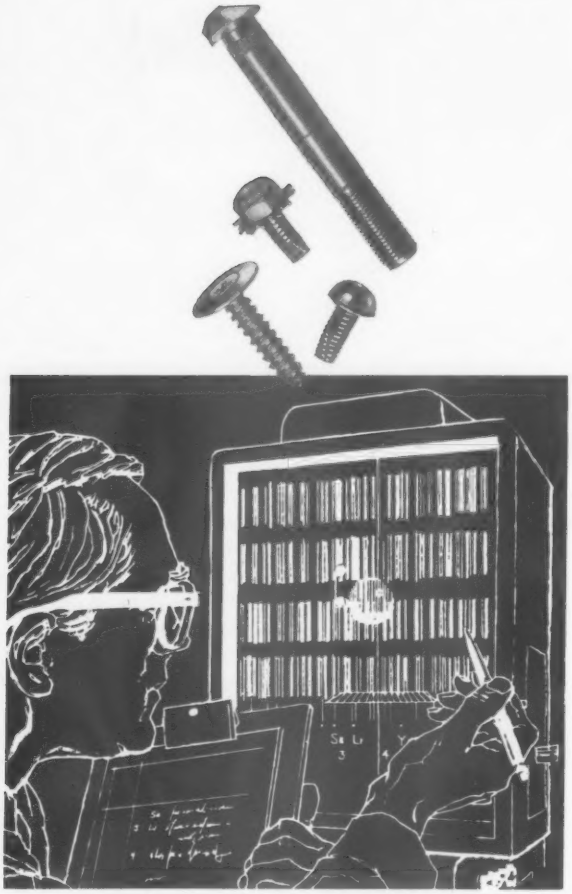
As the tension bolts are tightened, drawing the apexes together, the arms are pushed out to tense the monel wires and erect the mast.

As the principal element in transferring load from one set of tension and compression members to the next, the bolt joining the two aluminum members is critical. Tensile loading on the bolt, according to the builders, is as great as the total loading exerted on the eight 5/32 inch monel rods around the perimeter.

This is estimated by Edison Price at 1200 to 1500 lbs. for each of four diagonal monel carrying wires; somewhat less on the four verticals.

By this reckoning, the firm estimates that each of the ¼" diameter bolts is actually subject to total loading 3¼ tons, or 6500 pounds.

Since a bolt of minimum weight cross section was desired (minimum cross section was important for aesthetic reasons), the firm wanted a bolt capable of meeting extremely high tensile strength requirements.



The high quality of
NATIONAL LOCK FASTENERS
is more than skin deep

Quality wire is the basic ingredient for quality fasteners. That's why, at National Lock, quality control starts with elements of the raw wire. Here, a unique *spectograph* is used to make a complete qualitative analysis of the metal that goes into National Lock fasteners and cold-headed products. And, too, size, thread dimension, finish and other exacting customer specifications are checked with equal vigilance and thoroughness. National Lock fasteners are quality made inside and out to assure long-term, dependable performance.

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FOR AMERICAN INDUSTRY SINCE 1909

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FASTENER DIVISION, ROCKFORD, ILLINOIS

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BOLTS 'N NUTS FROM REPUBLIC

"Bolt Snatcher"

Adv. Republic Steel

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PLAN FOR 25,000 AT WELDING SHOW

Over 25,000 engineers, production men, research, development, and top management personnel, will converge on Los Angeles April 25-29 to participate in the American Welding Society 41st Annual Meeting and Welding Show. The technical meetings will be held in the Biltmore Hotel and the Show at the Great Western Exhibit Center. Nearly 150 national organizations are expected to exhibit and over 100 have already reserved space.

EATON PROMOTES RESEARCH DIV. ENGINEERS

Three promotions in the research and engineering staff of the Central Research Division of Eaton Mfg. Co., Cleveland, were announced. George R. Pipes, formerly chief engineer, has been advanced to assistant manager of the South Euclid, Ohio, division; Harold A. Frost, chief electrical engineer, is now manager of product development; and Joseph E. Urbassik was promoted to automation manager.

B&D NAMES TRESLAR GENERAL SALES MGR.

Black & Decker Mfg. Co., Towson, Md., has named Glen H. Treslar to the newly-created position of general sales manager of the Industrial-Automotive Division. He will supervise all divisional activities and personnel in the U.S. Treslar has been with the company since 1928, most recently as northeast regional manager.

BUCKEYE DEVELOPS MOBILE FIELD CLINIC

Buckeye Tools Corporation has developed a highly mobile field clinic that will form a two-way communications link between customers and factory in the proper application of portable air tools.

The Dayton, Ohio, firm recently equipped a late-model station wagon with representative industrial tools and accessories and is using the wagon to contact customers and field offices on a regular schedule.

Donald A. Hutton, a member of the Buckeye marketing staff, is in charge of operations.

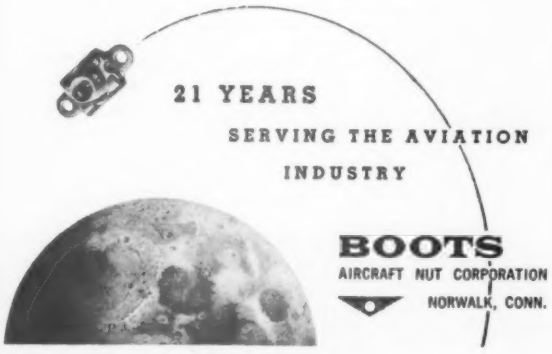
NYLOK-DETROIT NAMES SALES MANAGER

Harvey J. Thibodeau has been appointed sales administrator of Nylok-Detroit Corp., Birmingham, Mich. He was previously assistant manager of the Lapeer branch of G. B. Dupont Co., Inc. and the Economy Screw Div. of Federal-Pacific Electric Co., Chicago.

SNAP-ON FORMS NEW SALES ORGANIZATION

Irving Johnson will direct a new sales organization of Snap-On Tools Corp., Kenosha, Wis., operating in the area of the larger and more technical items of automotive, mechanical and electronic equipment. As national equipment sales manager he will direct this force working in

continued



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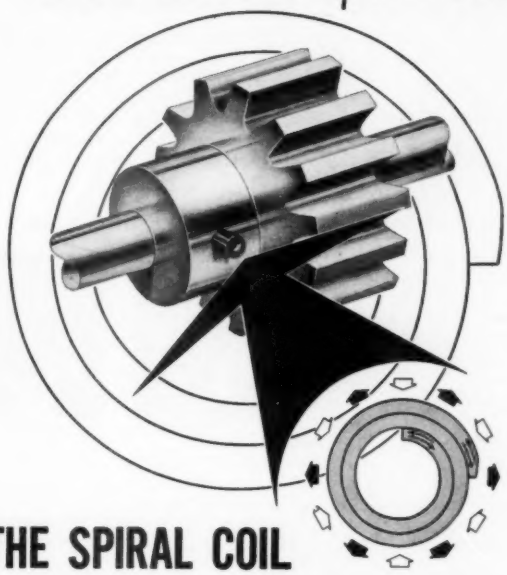
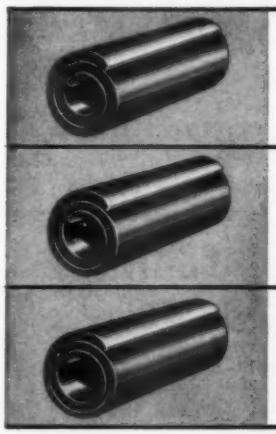
®SPIROL *the true spring* PIN



THE SPIRAL COIL
makes SPIROL a true spring PIN

SPIROL PIN is a spirally coiled metal strip that acts like a true spring. When the pin is compressed into a hole, the radial tension is distributed uniformly throughout the spiral coils. There is no concentration of stress. This real coil-spring action permits wider plus-*and*-*minus* hole tolerances . . . eliminates precision reaming. Available from stock in nickel stainless steel and other low cost, non-heat-treated metals; also carbon steel and chrome stainless steel hardened and tempered. SPIROL's greater resilience increases shear strength, shock and vibration resistance.

SPIROL offers the widest range of flexibility, tension, and strength . . .



HEAVY DUTY
For applications where shear and shock loads are extremely severe, Spirol pin's spring action withstands high stress.

MEDIUM DUTY
Flexibility enables medium duty pins to absorb severe vibration. Have adequate shear strength for majority of applications.

LIGHT DUTY
Recommended for use in soft and brittle materials where the allowable bearing loads are low.

SPIROL is the only Spring Pin in MINIATURE DIAMETERS

1/32" — .039" — 3/64" — .052"

FREE! *Write for literature on Spirol Pins.*

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all areas of the U.S. Johnson has been with Snap-On since 1934 and was Albany, N.Y., branch manager before this appointment.

DOWNS ELECTED SPRING ASSOC. DIRECTOR

Frederick R. Downs, Jr., sales manager of Stanley-Humason, Inc., of Forestville, Conn., a subsidiary of The Stanley Works, was elected to the board of directors for a three-year period at the annual meeting of The Spring Manufacturers Association, Inc., held at the Barbizon-Plaza in New York City. Also in attendance was Larned S. Whitney, Jr., vice president and general manager of the subsidiary.

NEW PLANT, OFFICERS FOR WELDING FIRM

Precision Welder & Flexopress (Canada) Ltd. has recently completed construction of a new manufacturing plant at 72 Carnforth Rd., Toronto 16, Ontario. It will also house the headquarters offices of the Canadian company.

AMOS

MOORE

William Amos has been named manager of engineering and sales, and Albert Moore has been named manager of manufacturing for the new plant. Both men have been closely associated with the manufacturing and marketing of Precision Welders and Flexopresses in Canada for several years.

WESTFIELD METAL VOTES ISHAM CHAIRMAN

Howard E. Isham, recently retired vice president and treasurer of the United States Steel Corporation has been appointed chairman of the board of the Westfield Metal Products Co., Westfield, Mass., announced Robert A. Johnson, Jr., president.

SOUTHERN SCREW REDESIGNS PACKAGE

Southern Screw Co., Statesville, N.C., has released a new consumer package for its screw product line. Retaining its dark green, soil-proof box bearing the color-coded EZ to C label system, Southern has added a diagonal repeat design of its signature emblem. The fasteners are stocked in hardware stores and by building supply dealers.

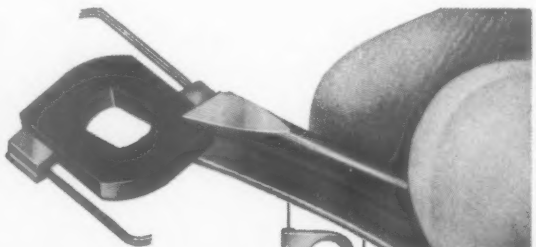
SOLAR PROMOTES ENGINEERING EXECUTIVE

Dr. Erwin O. E. Naumann has been appointed manager of development in the research and development engineering division at Solar Aircraft Company. Naumann has been Solar's chief of advanced studies, joining the company in 1956 following nine years at Wright Air Development Center's Equipment Laboratory as technical consultant.

UNITED SHOE ADDS TWO SALESMEN

Two sales representatives are announced by the Industrial Sales Division of United Shoe Machinery Corporation. Robert E. Davis and John A. Rush. Davis, a graduate of Loyola University of Chicago, has been assigned to the Chicago area. He was formerly employed as a sales representative in the same area by Better Packages, Inc. Rush has been appointed to the San Francisco area. He attended De Paul University before entering the stock brokerage field where he was employed prior to joining United.

another wonderful GRC idea for designers



GRC's UNIQUE AUTOMATIC METHODS INSERT THREADED PIECES, WIRES, even CONTINUOUS ELEMENTS, RIGHT IN THE MOLDING OR CASTING CYCLE

Fast . . . economical, GRC's exclusive automatic machines insert elements in zinc alloy die castings . . . in thermoplastic moldings, assure uniformity, eliminate assembly . . . make possible entirely new designs . . . cut labor and costs.

Write for bulletins, send prints for quotation.

No size is too small! Maximums:
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World's Foremost Producer of Small Die Castings

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A DOUBLE INSERT Part, automatically produced

For this IBM Brush Assembly, the core is die cast automatically and continually onto 6 strands of music wire, 3 on each side.

In the second cycle the nylon insulating jacket is molded automatically and continuously . . . right onto the die cast core and wire inserts.

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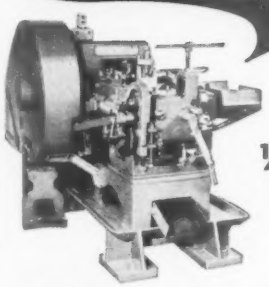
BEHR SINGLE and DOUBLE STROKE COLD HEADERS FOR UPSETTING AND FORGING BOLTS, SCREWS, RIVET HEADS AND OTHER SIMILAR SHAPES!



¼"x 2" CAPACITY

Capacity of wire, 1/4"; Stroke, 3"; Maximum length of cut-off, 2-7/8"; Maximum length of blank under head, 2"; Diameter and length of heading die, 1-3/4" x 2-1/2"; Diameter of finished punch, 1-1/4" x 2-1/4" long; Speed — Number of pieces per minute, 175; Number of strokes per minute, 350; Lubrication, Force Feed; Weight, 6000 lbs.; Overall dimensions, 81" x 46" x 51"; Motor, 5 HP, 3 phase, 60 cycle, 220/440 volts. Each header complete with motor, push button station, and foot brake.

MANVILLE 250C HEADER PARTS AVAILABLE FROM STOCK

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HELI-COIL NAMES FASANO, MORGAN V-P

John Fasano and David B. Morgan, Jr., have been appointed vice-presidents of the Heli-Coil Corporation, Danbury, Conn.

MORGAN

FASANO

Fasano, sales manager since 1956, started with Heli-Coil in 1951 as a sales consultant. He has been sales manager of the Korfund Co., Long Island City, N.Y., national sales manager for Truarc Division of Waldes-Kohinoor Co., Long Island City, N.Y. and manager of the Spirolox Division of Ramsey Corporation, St. Louis, Mo. Morgan, director of industrial and public relations, has been with Heli-Coil since 1952.

ENGINEERING PROMOTIONS AT B&D

The Black & Decker Co., Towson, Md., has announced a number of promotions. John L. Bennett, formerly engineering research manager, will be product development manager. Robert H. Riley, Jr., formerly chief administrative engineer, has been appointed technical services manager. Samuel H. Kohler is the new product development supervisor in the engineering department. He was development engineering supervisor.

Harry K. Shackelford is the new industrial-automotive sales representative in the San Francisco area.

HUCK FILM PROMOTES BLIND FASTENERS

Huck Manufacturing Company, Detroit, Mich., is currently releasing a new 13-minute color film promoting the use of Huck fasteners as cost-cutters for the modern assembly line. The use of Huckbolt fasteners is shown in a wide range of products, including railroad cars, truck trailers, steel and aluminum buildings, submarines, aircraft and missiles. A variation of the "time lapse" technique helps demonstrate

continued

SPECIAL RIVETS
like some of the samples shown here . . . or the more commonly used tubular and split rivets . . . they're all alike to the American Rivet Co. And always—our own special brand of quality and service that gets you what you want when you want it.
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Write for price list. For specials, send specifications for prices.
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BUY AMERICAN Tubular and Split RIVETS

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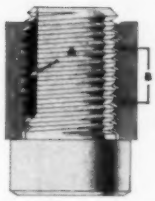
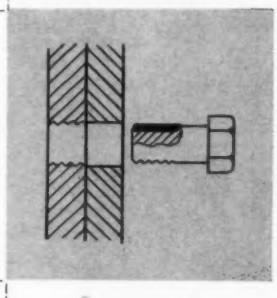
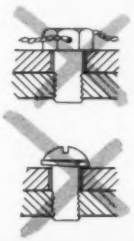
This is a LONG-LOK Self-Locking Screw. It is a one-piece reusable fastener, heat, vibration, impact and shock resistant.



It is vibration resistant because the resilient, reformable insert (A) acts as a wedge between the male and female threads, causing a metal-to-metal drag (B).



LONG-LOK Self-Locking Screws are flush protruded and pass through normal clearance holes with finger pressure. No special clearance holes are required.



LONG-LOK Self-Locking Screws save time and money because they eliminate safety wire (and head drilling), and lock washers. They also save weight.

LONG-LOK Self-Locking Screws are available for aircraft, missile and commercial applications. They meet MIL-F-18240 Specifications and can be head marked for self-lock identification.

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how the Huckbolt collar is swaged into locking grooves on the Huckbolt pin. The magnification in these scenes is of such a degree that flow lines of the collar metal are clearly visible.

CHRYSLER NAMES ASSEMBLY PLANT MGR.

E. C. Shawe is the new plant manager of the Chrysler Corporation St. Louis assembly plant. He succeeds N. E. McLeod, who has resigned. Shawe joined Chrysler in 1930 and since 1955 has served in various capacities at the Dodge assembly plant in Detroit, becoming manufacturing manager in 1959.

PROMOTIONS AT ASSOCIATED SPRING

Appointments of Joseph W. Wells as chief product engineer and Roland E. Brault as chief industrial engineer at Wallace Barnes Division, Associated Spring Corporation, have been announced.

Wells joined the firm in 1930 as an engineer and holds a patent on a Belleville washer assembly. He has served as consultant for the Spring Manufacturers Association. Brault was employed by Associated Spring prior to World War II, and rejoined Wallace Barnes Division in 1948.

HARTFORD MACHINE SCREW PROMOTES TWO

Hartford Machine Screw Company, one of five divisions of Standard Screw Company, has announced the joint promotions of J. F. Miller and M. J. Perrin to vice presidents.

PERRIN

MILLER

Miller steps up from general sales manager to vice-president, sales, while Perrin becomes vice-president, manufacturing. He formerly was factory manager.

PASSENGER SEATS in the "707" jets are covered with detachable upholstery utilizing Velcro nylon "touch and close" fasteners. This facilitates removal of the upholstery sections for cleaning. Note the easy peeling action for removing the covers. Adhesive furnished by the B. B. Chemical Co. is used to bond the tape to the metal frames of the seats.

ALLOYD ADDS TECHNICAL DIRECTOR

Dr. L. McD. Schetky has been appointed vice president and technical director of The Alloyd Corp., Cambridge, Mass. He will be in charge of research and comes from the Massachusetts Institute of Technology where he was chief metallurgist in the instrumentation laboratory.

HOUGHTON LABORATORIES CHANGES NAME

Houghton Laboratories, Olean, N.Y., has changed its corporate name to Hysol Corporation, announced Donald Roon, president. The firm was founded in 1949 and manufactures epoxy adhesives.

BOLTS: machine - carriage - lag - stove - threaded rod - studs - U - J - eye

SCREWS: Phillips - slotted - socket - machine - wood - cap - set - thumb metal (self tapping) - Sems - spincook

NUTS: hex - square - machine screw - stove bolt - finished - heavy - cap - wing FLEXLOC - elastic

WASHERS: wrought - square - bevel - flat - lock - internal - external - CTSK - finishing - machine screw - SAE

MISC.: cotter pins - taper pins - dowel pins - expansion bolts - shields - toggle bolts -

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Monel
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Corrosion Resistant

bolts, nuts screws, washers

Delivered when needed . . . because our stocks, our equipment and our staff are specialized to give you quality, dependability and service. We take the pressure off your production department . . . make the job easier for your purchasing and engineering department. Your specials are our specialty. Contact us for your requirements. Emergency and short runs a specialty—24-hour delivery when required.

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TORQUE BOOKLET

This 24-page booklet contains reprints of five authoritative articles on the subjects of "torque, tension and tightening." These articles were originally published in "Assembly & Fastener Engineering."

- WHAT IS PROPER TORQUE?
- HOW TIGHT IS TIGHT?
- HOW TO DETERMINE TORQUE TENSION RELATIONSHIPS
- TIGHTENING THREADED FASTENERS
- POWER TOOLS FOR TIGHTENING THREADED FASTENERS

The booklet is available for $1.00 per copy upon letterhead request to:

Reader Service Department
ASSEMBLY & FASTENER ENGINEERING
WHEATON, ILLINOIS

SALES ASSIGNMENTS AT THOR POWER TOOL

Robert J. Grace has been promoted to district sales manager of the Chicago branch and George A. Gambee to district sales manager of the Denver branch of Thor Power Tool Company, Aurora, Ill. Grace has been Cleveland district manager since 1955. Gambee has an eight-year Thor sales background in the San Francisco branch.

GRACE

GAMBEE

L. J. Hepworth will move from Salt Lake City to San Francisco to succeed Gambee and R. J. Horrocks from Denver to Salt Lake City to succeed Hepworth as service engineers. M. A. Sorenson will transfer from Denver to the contractor tool division in the Chicago branch.

ALLIS-CHALMERS NAMES CHIEF DESIGNER

Allis-Chalmers has appointed Arthur F. Erwin as chief of advanced design, Defense Products Division. Erwin has been with the company since 1935 and was most recently engineer-in-charge of the nuclear pump section.

UAP INC. PURCHASES WESTERN WAY WELDING

United Aircraft Products, Inc., Dayton, Ohio, announced the purchase of the assets of Western Way Welding of Gardena, California, and its immediate establishment as the firm's Western Division.

Western Way Welding's president Charles Neeley has resigned his position with the company to pursue another business venture but will continue his association in an advisory capacity. All other personnel, including the sales staff, will be retained under the new management.

George Palmer, recently assistant manager of UAP's West

continued

new

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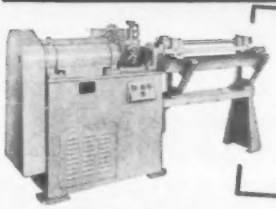
infinite, variable speed, electrically controlled,

Automatic Wire Straightening and Cutting Machine!



CAPACITY: 1/16" to 3/16" mild steel wire, 1/16" to 5/16" high tensile wire, 50 to 200 FPM.

Send for complete details on this high speed, low cost dependable SHUSTER! Ask for our quotes on your wire straightening and cutting needs for any wire sizes from .020" to 1 1/16".

SHUSTERS give you straightened and cut wire *when* you need it, at lower investment than any comparable machines. The right combination to lowered production costs is *coiled* wire plus a dependable SHUSTER. Let one of our sixty representatives (there's one near you) give you the facts. Let us show you how you can materially lower your wire production costs!

Send for free, handy, wall-size split gauge wire chart from 41 gauge to 7/0.

METTLER MACHINE TOOL, Inc.

155 Adeline St. New Haven, Conn.

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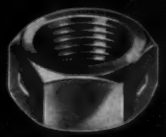
SPEED PRODUCTION and LOWER COST on your products with this GRIP-NUT family of GRIPCO FASTENERS

GRIPCO LOCK NUT
One piece all metal.



GRIPCO CENTERLOCK NUT
Locking feature in the center for fast feeding. Can be applied from either end.

GRIPCO CLINCH NUT
With or without Gripco Lock. For application to metal too thin to thread or for inaccessible assemblies. Hex collar prevents turning when torqueing bolt.

GRIPCO PILOT-PROJECTION WELD NUT
With or without Gripco Lock. Centering collar positions nut and protects threads from weld spatter.

GRIPCO COUNTERSUNK WELD NUT
With or without Gripco Lock. Countersink protects threads from weld spatter.

All types and sizes of Gripco fasteners listed in catalogue are available for immediate delivery.

Qualified fastener engineers are available for consultation on all your assembly problems.

Other Gripco Products:

- BRASS GRIPCO OR CENTERLOCK NUTS.
- MINIATURE WELD AND CLINCH NUTS, WITH OR WITHOUT LOCK.
- GRIPCO AND CENTERLOCK HI NUTS.
- STANDARD SEMI-FINISH FULL AND JAM NUTS.
- STAINLESS STEEL LOCK, WELD AND SEMI-FINISH NUTS.
- COLD FORMED SPECIAL NUTS OR PARTS TO PRINT.

The Nation's Oldest Manufacturer of Lock Nuts

124 *Send for samples and NEW CATALOG today*

GRIP-NUT COMPANY

113 MAPLE AVE. ★ SOUTH WHITLEY, INDIANA

Use postpaid card. Circle No. 263

Coast sales office and former head of his own sheet metal company in the Los Angeles area, will become general manager of the new division.

ILLINOIS TOOL PROMOTES SHAKEPROOF MEN

BRUSE

PONTIUS

MacKAY

Three executive promotions have been named by Illinois Tool Works, Chicago. Andrew L. Pontius, vice president, was named vice president in charge of operations of the company's Product Divisions. He was general manager of the Shakeproof Division.

William E. Bruse has been appointed general manager of Shakeproof. His position as plant manager has been filled by Kenneth C. MacKay, most recently Lockwasher products manager and merchandising manager at Shakeproof.

FUSION ENGINEERING ADDS REPRESENTATIVE

Lor Mac Associates of Michigan has been appointed sales representative in that state for Fusion Engineering Co., Cleveland, Ohio.

LAKE TO DIRECT KODAK QUALITY CONTROL

William L. Lake has been appointed director of quality control for Eastman Kodak's Apparatus and Optical Division. He succeeds Clifford A. Wallace, who has retired after 41 years of service. Frank H. Wakeley has been named manager of apparatus service, succeeding Lake.

AWS PRESENTS DESIGN FOR WELDING PAPER

Design for welding the automotive industry was the subject of a paper by T. W. Shearer, Jr., Fisher Body Division, G.M.C., presented at the national fall meeting of the American Welding Society, in Detroit.

The paper previewed a "Design for Welding Manual" to be made available to the automotive industry in the near future. The manual is being prepared by the Automotive Welding Committee of the AWS to help the designer provide the process requirements in his design which will enable the fabricators to produce a quality product by the most economical means.

GARLOCK APPOINTS PRODUCT MANAGER

G. Parry Wiess has been appointed product manager of the gasketing product line of The Garlock Packing Company, Palmyra, N.Y. He has been general sales manager of La Favorite Rubber Company.

VEEDER-ROOT PROMOTES KALLINICH

Arthur E. Kallinich, a member of the board of directors of The Holo-Krome Screw Corp., West Hartford, Conn., has been named vice president in charge of new products and new businesses of the parent company, Veeder-Root Inc., Hartford, Conn.

He was formerly vice president in charge of catalog sales, a position he held since 1947. Kallinich has been with Veeder-Root Inc. 47 years, starting as a mail clerk in 1912.

THOR POWER MOVES CLEVELAND OFFICE

Thor Power Tool Company, Aurora, Ill., manufacturer of portable air and electric tools, has opened a new sales and service branch headquarters at 4200 Brookpark Rd. in Cleveland to serve northern Ohio.

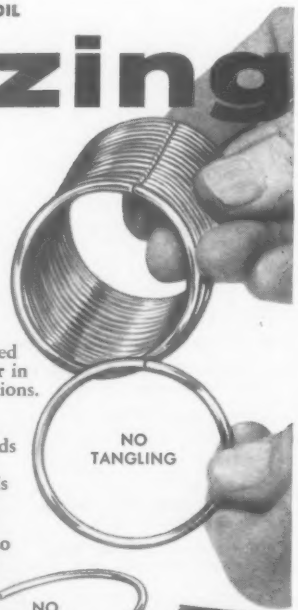
NO TANGLE-NOTCH COIL

brazing rings

Snap OFF COIL

PLACE ON PART

Preformed No Tangle-Notch Coil Rings end wasted time in placing silver solder in position for brazing operations. Rings fit quickly and accurately on parts to be joined. Cut and try methods and resulting rejects are eliminated. Silver solder is actually metered to flow evenly — positive bond. Ring Diameters from ¼" to 12" — +.001. Wire Sizes .020 to .093.



Write for 16 page booklet on better brazing.

LUCAS-MILHAUPT *Engineering Co.*

5051 South Lake Drive, Cudahy, Wisconsin

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Fine tools that encourage Good Work

ARMSTRONG WRENCHES

If you don't know your local ARMSTRONG Distributor, we will send you the names of those in your area.

An ARMSTRONG Wrench feels right—is balanced. It goes over nuts or screw heads easily, grips firmly without sloppiness, won't round corners—because openings are carefully machined to correct sizes. It's safe, strong beyond need without clumsy bulk—because of superior design and selected steels, heat treated to proper degree of hardness and tensile strength. It's quality finished, ARMALOY (alloy steel) Wrenches in chrome plate with heads buffed; HI-TEN (carbon steel) Wrenches in baked-on gray enamel with heads ground bright . . . all plainly marked for size. All are uniformly excellent tools manufactured under strict quality control, by modern methods, with modern equipment in a modern tool plant . . . 1537 different industrial sizes and types —single wrenches, or sets in metal cases, boxes or rolls . . . each a quality tool. Armstrong Wrenches are "Fine tools that encourage good work."

ARMSTRONG BROS. TOOL CO. 5203 W. ARMSTRONG AVE. • CHICAGO 46, U.S.A.

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A LICENSING AGREEMENT was signed by Rubber & Asbestos Corp., Bloomfield, N.J. with a Mexican firm which will manufacture and distribute a group of solvent-dispersed adhesives. Adolfo Patron, technical director of Adhesivos Resistol, and R&A officials, E. H. Greene, treasurer, and B. E. Sugerman, president, closed the agreement.

HELI-COIL ADDS ASS'T. SALES DIRECTOR

Hiland Hall has been appointed assistant to the director of sales for the Heli-Coil Corp., Danbury, Conn. He has been vice president for eight years with Industrial Distributors, Inc.

BURGESS JOINS HUCK MFG. AS CONTROLLER

Virgil P. Burgess has been named vice president and controller of Huck Mfg. Co., Detroit. Burgess comes from Chrysler Missile Division. His background includes 8 years as treasurer and controller with Morse Chain Co. He has also served as controller with Houdaille Industries, R. Hoe and Company and Allied Products.

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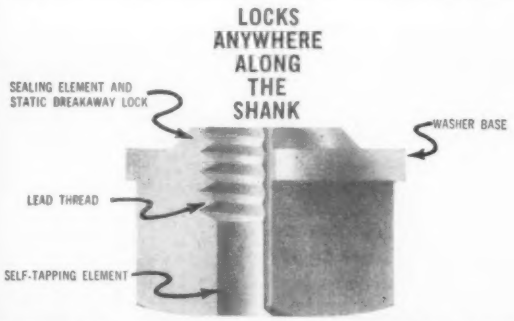

NEW Nylogrip BRILOK® self locking nuts

New Nylon Brilok self-tapping nuts lock at any position along the shank of the screw. As the screw turns into the ruggedly resiliant Brilok, the material is displaced, and the resulting counter-compressive force causes a tight friction lock. More tightening causes the cone to extrude into the clearance spaces, forming a highly effective seal against liquids, gases, or corrosion.

Advantages: ideal for all applications requiring light weight, high temperature stability, toughness, abrasion resistance and corrosion resistance.

Available in natural nylon and colors, with or without lead thread. For complete information write:

NYLOGRIP PRODUCTS

566 Pleasant St., Watertown 72, Mass.

Use postpaid card. Circle No. 266

now-

SHEAR-PROOF ALLOY STEEL

DRIV-LOK PINS *for maximum resistance to*

shear *shock* *fatigue*

- Drill a hole and drive them in . . . they're grooved and self-locking
- Provide the ultimate in physical properties at moderate cost
- Re-usable without loss of holding power

Now, you can get the efficiency, convenience and proven economy of DRIV-LOK Grooved Pins PLUS maximum resistance to shear, shock and fatigue, by specifying or installing *Shear-Proof* DRIV-LOK Pins. Made of alloy steel, heat treated to provide optimum physical properties and high shear values, Shear-Proof DRIV-LOK Pins are designed for critical applications where ultimate strength and reliability are mandatory. They are replacing alloy dowels, bolts, key and set screw assemblies, hollow pins (used singly, or one inside the other) in widely varied applications . . . thus saving time, labor and material. Write for special Shear-Proof DRIV-LOK Pin Catalog. Sample Type A Shear-Proof Pins furnished free on request.

type A standard

SPECIAL TYPES TO ORDER . . .

A3 B C D E U

COMPARE TYPICAL SHEAR VALUES (Minimum double shear strength in pounds)	Diameter	Slotted Spring Pins	Coiled Spring Pins HEAVY DUTY	SHEAR-PROOF DRIV-LOK PINS
	3/32	1000	1030	2040
	1/8	2100	1840	3690
	5/32	3000	2880	5720
	3/16	4400	4140	8240
	1/4	7700	7360	14720
	5/16	11500	11500	22960
	3/8	17600	16580	33160
	7/16	20000	22540	45000
	1/2	25800	29440	58900

DRIV-LOK SALES CORPORATION

731 PARK AVENUE • SYCAMORE, ILLINOIS

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ENGINEER JOINS HARVEY HUBBELL, INC.

Carl B. Peterson has recently been added to the sales engineering department of the Cold Headed Fastener Department of Harvey Hubbell, Incorporated, Bridgeport, Conn. Peterson was formerly in the engineering department at the Bullard Machine Tool Company. He is a graduate of St. Johns University in Brooklyn, N.Y.

ENGINEER SPEAKS ON AUTOMATIC ASSEMBLY

J. F. Stoltz, department chief of development engineering at Western Electric's Hawthorne Works in Chicago, will speak on automatic assembly at the Third Annual Conference on Automatic Techniques in Cleveland, Apr. 18-19.

Stoltz will review the factors which affect the feasibility of automatic manufacture and assembly, including the influence of product design. He will discuss economic criteria in determining feasibility. The session will be on April 18.

ALPHA METALS ELECTS HERTZOG PRESIDENT

Harold Hertzog, former vice president, has been elected president of Alpha Metals, Inc., Jersey City, N.J. He has been with the firm since 1945. Martin A. Boyle, field sales manager since 1945, was named vice president in charge of sales. Rena Shonberg was elected secretary-treasurer.

BOYLE

HERTZOG

M & T APPOINTS WELDING SALES ENGINEER

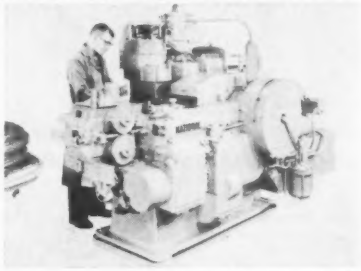
Peter L. DeDecker has been appointed welding sales engineer, west-central region, announced R. T. Brown, welding division sales manager, Metal & Thermit Corporation.

DeDecker, who will be headquartered in Davenport, Iowa, was formerly with Jacobs Welding Supply Company of that city. He is a graduate of St. Ambrose College.

MID-WEST SPRING PROMOTES DUNNE

Mid-West Spring Mfg. Co. has promoted James J. Dunne to sales manager and general office manager of all plants. He was previously purchasing agent in the Chicago office.

COLD HEADER ALSO POINTS, THREAD ROLLS



A 5/16" size cold heading machine which also points and thread rolls—the first such in the industry—has been installed at the Rockford Screw Co., Rockford, Ill.

The National Single-Die Boltmaker turns out 175 finished fasteners per minute and features a single heading (4") die, solid cutter (standard stroke), two-blow heading tools, blank elevator and orienter, extrusion pointing and a thread rolling station.

Weighing 14,800 lbs., the machine has a 15 hp motor.

LEWIS BOLT SELLS GALVANIZING PLANT

Meyer Paper, president, announces that the Lewis Bolt & Nut Company's hot dip galvanizing facilities in Minneapolis have been purchased by the Metal Coating Corporation of Chicago.

All personnel employed in the Lewis galvanizing operation will be retained in the company's Minneapolis fabricating plant. The electroplating division in St. Paul, located at 218 South Wabasha, will not be affected.

Paul S. Doherty, Jr., president of the Metal Coating Corporation, states that at peak capacity 50 to 75 new employees will be added to its payroll at its new Minneapolis address. When operating at capacity, he expects that the plant will turn out a volume of 10,000 to 12,000 tons per year.

HEYCO Nylon STRAIN RELIEF BUSHINGS

The insulating bushing that anchors a cord set to an electrically operated machine or appliance.

HEYCO JUNCTION-TERMINAL BUSHINGS

ELIMINATE "PIG-TAILS"—MINIATURE SIZE SNAP-IN ASSEMBLY COLOR CODED CAN BE USED AS PLUG-IN RECEPTACLE

Provides simple quick disconnect

ACCORDIAN TYPE

Fit curved surfaces
Color & Number coded
Nylon bushing — brass tab

HEYCO NYLON Snap Bushings

10 Sizes for holes from 3/8" to 1 1/2" dia.—various inside diameters. Snap locks into panels up to 1/8" thick.

SAMPLES FREE
ASK FOR THE BUSHINGS OF YOUR CHOICE

HEYMAN MANUFACTURING CO.
KENILWORTH 17, NEW JERSEY
HEY MAN!—SAY HEYMAN

Use postpaid card. Circle No. 268

NEW DIXON AUTO-TORQUE Driver

SCREWS AND NUTS AUTOMATICALLY DRIVEN WITH PRECISE TORQUE CONTROL

Gives you . . .

1 Complete control of screws from parts feeder to chuck, until threads are started. No dependence on gravity to load chuck.
2 Exclusive built-in sensing, assures that screw is driven. Automatically retracts driver only after attaining proper torque.
3 Complete automatic cycle, requires only a touch of the pedal.
4 Torque accuracy within 5%, comparable to most precise hand-torquing methods.
5 Clutch free-wheels after driving. Operator cannot vary the torque.
6 Two ranges of torque available 0 to 84 inch-pounds and 48 to 120.
7 Work height adjustment with 14" range, can be made without in any way disturbing the machine adjustments.

The new DIXON *Auto-Torque Driver* includes all the features of the DIXON Auto-Positioner, and has an efficient space-saving air motor with an adjustable-torque clutch. These features provide for *positive* handling, giving new efficiency in driving screws and nuts.

Full information available in bulletin No. SD-81.

Model SD-100, above, tooled for any standard screw up to 5/16" thread size. Special tooled units with multiple feeders available. Model SD-101, without floor column, provides a complete automatic station. Maximum width 6 inches.

DIXON AUTOMATIC TOOL, INC.
2309 - 23rd AVENUE
ROCKFORD, ILLINOIS

DIXON

EQUIPMENT FOR AUTOMATIC PARTS HANDLING AND ASSEMBLY

Use postpaid card. Circle No. 269

TURNBUCKLES ADDS WIRECRAFT DIVISION

Turnbuckles, Inc., Grand Beach, Mich. has formed a new Wirecraft Division specializing in all types of fabricated wire forms for industry. Ray E. Swanson will direct the division, according to R. R. Osborn, president.

The Wirecraft Division occupies a newly-constructed addition to the plant. Equipment includes a tool room, for the construction of all tools; punch presses, coining presses, all sizes of butt-welders and spotwelders, a large battery of four-slide automatic wireforming machines, burnishing barrels and packaging machines.

PALL FILLS FOUR ENGINEERING POSTS

HACKER

KURZ

Dr. David B. Pall, president of the Pall Corporation, Glen Cove, N.Y., announced the creation of four new major engineering posts and appointments: chief engineer industrial filters, Charles H. Hacker, manager of porous metals, Martin Kurz; assistant sales manager, Stanley Sakol, and director of quality control, Morris Sankey.

DEVELOPMENT ENGINEER JOINS A-C

Gerald G. Christiansen has been named development engineer in the pyro-processing section of the Allis-Chalmers Processing Machinery Department.

Christiansen has a wide background in chemistry and cement manufacture. Before coming to Allis-Chalmers he participated in an international study of cement manufacture and the Korean cement industry. Earlier he had been successively a research chemist for Lehigh Portland Cement Co., Allentown, Pa., and technical assistant to the vice president of the California Portland Cement Co., Colton, Calif.

continued

1-PART NO-MIX EPOXY ADHESIVE

speeds production bonding

If you can heat-cure at 300°F (or higher) this unique *one-part*, 100%-solids epoxy paste adhesive –BONDMASTER M620–can:

- give you high-strength bonds with all metals, all plastics;
- eliminate costly post-finishing (won't flow or drip during cure!);
- let you use unskilled labor on critical bonding jobs;
- eliminate time-consuming weighing and mixing of separate components.

USE RIGHT FROM SHIPPING CONTAINER

Spreads as easily as a heavy cold cream just as you receive it. Thixotropic, too—won't flow or drip; excellent void-filler.

Write for detailed Data Sheets and Technical Article reprints.

RUBBER & ASBESTOS CORP.
224 BELLEVILLE AVE., BLOOMFIELD, N. J.

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MULTIPLE OPERATIONS
on COLD HEADED PARTS

All operations performed simultaneously

Feed once for all operations

Mill shank end square (Corrects angular cut-off; makes length exact; provides superior, even crimping all around)

Tap drill

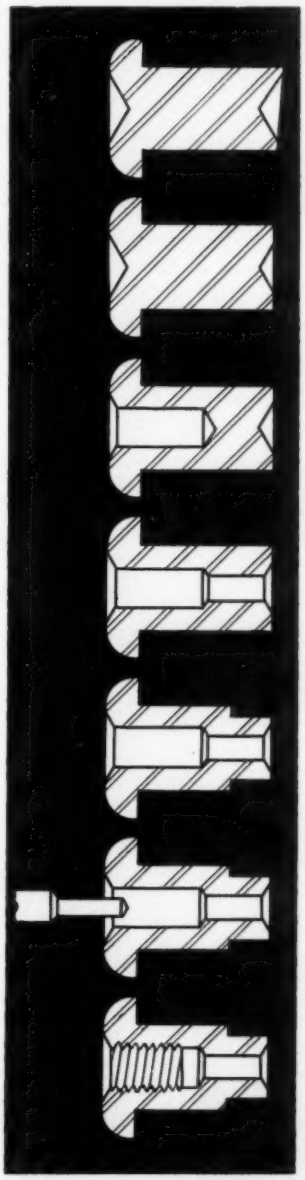
Drill thru from shank end (Faster than with long stroke required by drilling from head end)

Hollow mill, concentric with hole & body (Smooth finish; no burrs; simple, inexpensive tooling)

Probe, to be sure both holes are drilled before tapping

Tap

50 to 120 pieces completed per minute, depending on size and material



BECO Multi-Spindle Machines

means fastest production and least labor cost

BATCHELDER ENGINEERING CO.
Springfield, Vermont

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RISDON ANNOUNCES SALES PROMOTIONS

Russell R. Ayres, Jr., has been named general sales coordinator of The Risdon Manufacturing Co., and John K. Quinn has been appointed assistant sales manager of the firm's Cosmetic and Aerosol Divisions.

Ayres, who has been with Risdon since his graduation from Harvard College in 1940, will coordinate sales activities of the company's Aerosol, Cosmetic and Metal Goods Divisions. He had been sales manager of the Metal Goods Division since 1952.

LAMSON & SESSIONS ELECTS NALL V-P

J. Wallace Nall has been elected a vice president of The Lamson & Sessions Co., Cleveland. He will continue as general manager of the Chicago plant, a position he has held since 1959. Nall joined the company in 1937 at its Birmingham, Ala., plant and was named Birmingham Division sales manager in 1945. He is a graduate of Alabama Polytechnic Institute.

R B & W ELECTS SCHLAUDT VICE PRESIDENT

Edward H. Schlaudt has been elected vice president and assistant treasurer of Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N.Y. Schlaudt will be responsible for financial matters and will also serve as general counsel.

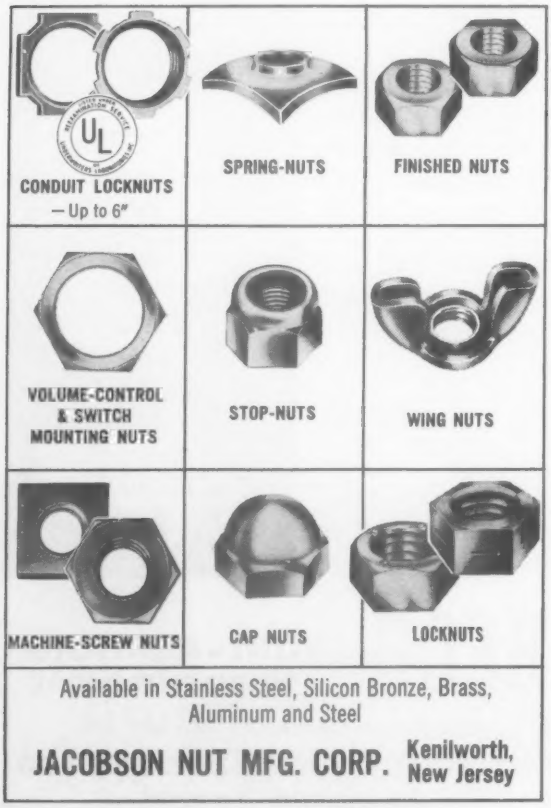
Schlaudt joins R B & W after serving since 1954 with Texaco's legal department. From 1952 to 1954 he was general corporate and tax partner with Lundgren & Lincoln, before which he served for 10 years with Sullivan & Cromwell. He is a Doctor of Jurisprudence graduate from the University of Michigan Law School.

Malcom M. Hubbard, president of Hermes Electronics Co., prepares to sign a technical agreement with Marconi's Wireless Telegraph Co., Ltd., and A. W. H. Cole, manager of Marconi's communications division.

U.S.-BRITISH FIRMS SHARE TECHNOLOGY

Hermes Electronics Co. and Marconi's Wireless Telegraph Company, Ltd. of England have reached an agreement providing for general technical collaboration between the two companies in the field of point-to-point communication. The agreement, in the future, may be expected to lead to cross-licensing arrangements between Marconi's and Hermes and may also broaden the product line of both companies.

Marconi's Communications Division and Hermes intend to collaborate specifically in planning and supplying complete systems; Hermes will also become agent and licensee for Marconi point-to-point radio communication equipment in the United States. Under the agreement, it is also intended that the Marconi Company will become licensee and agent for certain Hermes specialized components and equipment.



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this machine will drive up to 10 screws at one time . . .
. . . reducing assembly costs and improving quality. Built for high production jobs where a fixed set up is practical, this multiple spindle screw driving machine automatically feeds screws from a hopper and drives them to a predetermined torque. Evenly distributed pressure eliminates stresses caused by driving home one screw at a time. A simple sliding fixture positions work pieces accurately.
Machine illustrated shows application of multiple spindle screwdriving to assembly of electric power drills.
Send a sample of your assembly and a list of your requirements. We will be happy to show you how multiple spindle screw driving can be applied to your job.
COOK & CHICK COMPANY
2415 West 24th Street Chicago 8, Illinois

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NEW YORK TO HOST DESIGN ENGINEERS

The application of space age design theory and techniques to new products for the home and factory will be the subject of an extended four-day conference in New York.

The Design Engineering Conference, which will be held concurrently with the Design Engineering Show, May 23 through 26, at the New York Coliseum, will consider advances made in power, control, materials, computers, components and mechanics to determine how everyday products may be improved.

The conference will be sponsored by the machine design division of the American Society of Mechanical Engineers. The show will be produced by Clapp & Poliak, Inc., New York. More than 400 companies will exhibit at the show which will occupy all four floors of the Coliseum. More than 20,000 engineers and executives are expected to inspect the exhibits and attend the conference sessions. About 4000 experts from various companies will be on hand to answer visitors' questions.

The first day's conference session will be devoted to "New Horizons in Engineering Design." This will be a panel discussion of design authorities in nuclear and space technology. They will give brief talks and answer audience questions to indicate how new design principles, relationships and formulas developed for their fields can be applied to commercial products.

Speakers will give special attention to applications of material and components to meet extremes of environmental conditions and to achieve the ultimate in performance. High temperatures, low temperatures, erosion, corrosion, impact, vibrations, miniaturization, reliability and limited life will be among the items discussed.

Sessions on power and control will consider "Reliability Predictions," "Impact of Reliability on Design" and "Analysis of Control Systems." Sessions on materials will hear papers on "New Welding Processes," "Metal Part Fabrication by Explosives," "Some Characteristics of High Strength Steels"

continued

For torqueing problems USE the

New

"TITANTORKER" controlled TORQUE DRIVER

"TITANTORKER" makes controlled power torque available for a variety of torque uses—at low cost.

When desired torque is reached an audible signal is given as the internal driving balls are forced out of their sockets and overrun.

EASY ADJUSTMENT—For increased or decreased torque, "TITANTORKER" can be simply adjusted with an Allen wrench.

"TITANTORKER" can be used with any motive power except impact wrenches. Is ideal for most controlled power torque problems due to ease of adjustment and maintenance.

Available in 4 sizes in maximum torques from 75" lb. to 225' lb., with Female Adapters in driving head and Male Adapters on torque base.

Write for details and prices

TITAN TOOLS — World's Largest Producers Of Stud Drivers And Pullers

TITAN TOOL CO.

47 MAIN ST., FAIRVIEW (ERIE COUNTY), PA.

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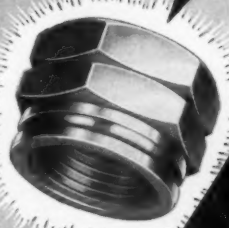
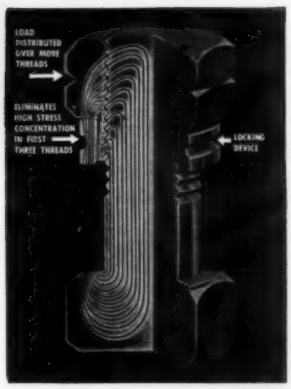
TESTED and PROVED *On the Speedway* *In the Skyways*



Klincher LOCKNUT

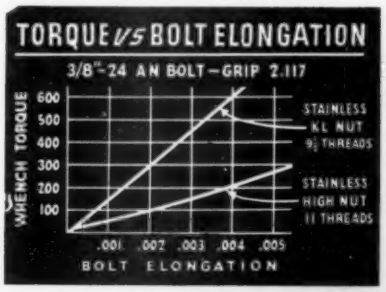
. . . take advantage of **ALL *the* STRENGTH** *designed in your bolt!*



. . . has no equal where TENSILE STRENGTH, VIBRATION, CORROSION, HIGH TEMPERATURE ARE FACTORS!

On the severest of all jet engines, race car and like applications, Klincher has been tested, proved and acclaimed for these outstanding advantages:

- Can be re-used many times!
- Saves time, labor installing, removing!
- Only one piece to stock and handle!
- Ideal for standard and power wrenches!
- Manufactured in various materials!

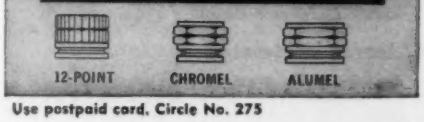


Inquiries are invited regarding special locknut problems involving shank nuts, weld nuts, channel nuts and others. Write for data and samples, giving size and application. Address Dept. D-1.

Write for data and experimental samples, giving size and application.

Address Dept. AF-3.

Klincher LOCKNUT CORPORATION
2153 Hillside Ave.
Indianapolis, Indiana



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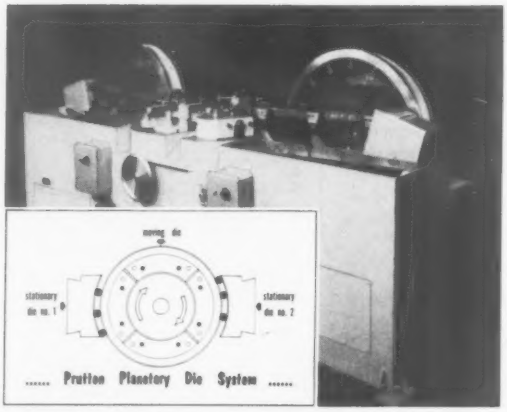
PLANETARY THREAD ROLLING MACHINE CUTS COSTS

Rolls Nails
48,000 PIECES PER HOUR

Designed exclusively for threading nails. This Prutton Planetary thread rolling machine can hammer up rolling production

500%



PRUTTON'S PLANETARY CIRCULAR DIE accounts for the tremendous increased production speed. Patented horizontal vibratory feed tracks feed nails to each side of the die in a continuous stream. The "lost motion" of the reciprocal type thread roller is completely eliminated.

Rolls nails at 600 to 800 pieces per minute. One customer reports a top speed of 1300 pieces per minute. A mere 150 pieces per minute represented top speed with this same customer on another make thread roller.

In addition to speed advantages the Prutton Model 125B-HV permits the operator to have complete access to the entire feed track and the inside of the hopper at all times. Total hopper capacity up to 150 lbs. Odd sizes and "bad blanks" can be quickly and easily removed without stopping the machine. There is absolutely no nail spillage. Working at this machine is like working at a bench. Loading height is a mere 36 inches.

HIGHER OUTPUT AND LOWER COSTS ADD DOLLARS TO YOUR THREAD ROLLING PROFITS...

A Prutton can be used for thread rolling, roll forming, knurling, marking, serrating and necking of nails, bolts, screws and special parts in a wide range of sizes. Send prints and/or samples for free estimates on machine costs.

Write or Phone for Cost Saving Information TODAY!

Prutton
CORPORATION
5295 WEST 130th STREET
CLEVELAND 30, OHIO

Leader in Planetary Thread Rolling

JUST PIN THIS COUPON TO YOUR LETTERHEAD

PRUTTON CORPORATION
5295 West 130th St.
Cleveland 30, Ohio
Dept. AF

Please send information on Model 125B-HV Thread Rolling Machine.

Name..... Title.....
Company .....
Street Address.....
City..... Zone..... State.....

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and "Composite Materials." Mechanical sessions will be devoted to "Hydraulic Components for Extreme Service," "Fluids and Seals for Extreme Service," "Modular Dimensioning for Automatic Assembly" and "Basic Design Parameters for Automatic Assembly."

A final session, by a panel, will discuss "Use of Computers in Design."

Visitors who wish show or conference information, hotel reservations or rapid registration cards should write Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N.Y.

CHAMPION TO DROP MILD-STEEL ROD LINE

Champion Rivet Co., Cleveland, announced the termination of its domestic production of mild-steel welding electrodes April 1, 1960. The company will concentrate on specialty rods in alloy steels.

CHRYSLER NAMES QUALITY CONTROL DIRECTOR

A. P. Podges will direct quality control for Chrysler Corporation's Car and Truck Assembly group, announced F. M. Glassford, group executive.

Podges joined Chrysler in May, 1957 following 23 years of service in the automotive industry, chiefly in manufacturing and quality control areas. In 1958 he was appointed production manager of the Imperial Assembly plant, the position he held until his present promotion.

MODERN ENGINEERING APPOINTS TWO SALESMEN

Modern Engineering Co., St. Louis, Mo., announces the appointment of Roy Brigance and Vint Gubbins as factory sales representatives for its Meco Oxy-Acetylene Welding and Cutting Apparatus and Industrial Regulator Divisions.

Brigance will work with distributors in Ohio and adjacent areas and headquarter in Cleveland. Gubbins will have the Illinois territory which includes parts of adjacent states; headquarters near Chicago. Federico Marrero has just joined Meco's Export Division to work with distributors in Latin American countries.

HUCK EXPANDS PLANT FOR HEADING EQUIPMENT

Expansion of Detroit plant facilities to provide room for large capacity multi-stage heading and rolling equipment now on order has been announced by Mr. A. W. Armour, president of Huck Manufacturing Company.

"Current trends, particularly in the shipbuilding and construction industries, point to the use of more and more large diameter lock bolt fasteners," Mr. Armour said.

The Huck expansion program calls for installation of large heading machines. The new equipment will have capacity for production of fasteners of ¾", ⅞", and 1" diameter in mild steel, and up to 1¼" diameter in aluminum.

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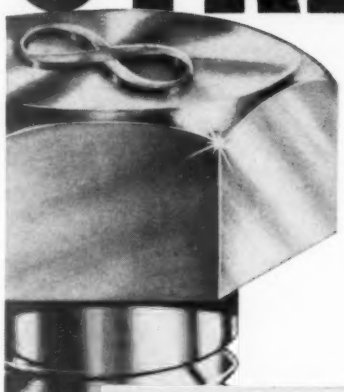
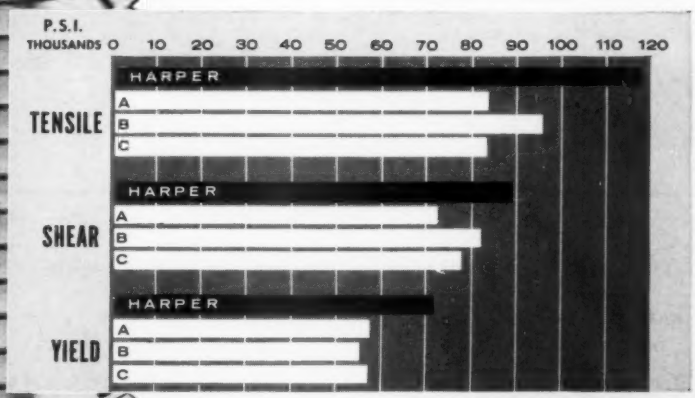
GREATER BOLT STRENGTH



Here's irrefutable *proof* of greater bolt strength! The Robert W. Hunt Company tested Harper Stainless Steel Machine Bolts in comparison with similar bolts of three other leading manufacturers. The results—Harper bolts had 35% greater tensile strength; 15% greater shear strength; 26% greater yield strength! Get the facts in a complete report prepared for you.

Harper Distributors are *everywhere!*
. . . see your Yellow Pages!



CORROSION-RESISTANT FASTENINGS

HARPER

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H. M. HARPER COMPANY
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Gentlemen:

Please send me your report on "Greater Bolt Strength" at no cost or obligation.

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ONE LAST WORD

THE HIGH COST OF CHEAP FASTENERS

Let's buy it cheap," the man said. "We'll find an alley shop which can cut the price 'way down. Let's get on to someone who hasn't got an engineering cost." Bargain hunting is not limited to women and women's dresses. Even in the country's largest industrial firms, needle-nosed buyers smell out cheap fasteners with an accuracy, a skill and a tenaciousness which puts even a bloodhound to shame.

Yes, sir, he saved twenty cents here, ten cents there, and his report to management is a model of efficiency, terseness and economy. "Yes, indeed," management says, "old Needle-Nose has done it again. There's a man who's got a sense of economy."

Yes, it is sadly true, good old Needle-Nose has performed well. The rivets he bought stick in the hopper. "Might as well assemble manually," production grumbles. The slots of some of the screws he got stuck with aren't accurate; they too, stick in the automatic screw driver. The bolts he purchased so cheaply, and over which stroke of business acumen he rubs his hands in unholy glee, require two parts and an additional assembly operation.

Now, all of these unfortunate trivialities are brought to the attention of Needle-Nose. This situation he will fix at once. Now he insists on quality products at the cheapest price, and to make doubly sure that he gets it, additional inspectors are hired to inspect incoming fasteners. The problem is solved. Production is silent.

But, lo and behold, come the reports from the field. "Why does this assembly continue to fail? The stuff is rusted on tight. And listen, all those self-tapping screws are spinning around like hula-hula dancers. What kind of design engineers we got, anyway? Don't those fellows at the factory know anything? It's this cheap labor you get nowadays."

However, old Needle-Nose's report to management is a model of efficiency, terseness and economy.

If anyone thinks I'm kidding or being funny, I should like to refer you to one of the country's largest industries where this goes on daily.

Unfortunately, it is you—the designers, the engineers, the production people—who get blamed for high assembly costs, poor design, for failure in the field. You must bear the brunt of Needle-Nose, who buys cheap, and whose reports are models of efficiency, terseness and economy. It is personnel who gets blamed for hiring additional inspectors, and the quality control manager gets called on the carpet for rising inspection costs.

Who is basically to blame? Is it Needle-Nose for his economy? Is it design or production for not being better informed about the cost of fasteners in relation to the cost of assembly? Is it management for its constant insistence on economy, and for encouraging Needle-Nose to seek out the alley shops and the cheap prices?

When you take any business away from a vendor who has engineering cost, and give it to the fellow who has no such costs, you're going to pay through the nose eventually when . . . as you surely must one day . . . you need specials, whether it be machines or components. Possibly we are all to blame a little bit. For too many years we have dismissed fasteners as unimportant items. When all is said and done, the old gag still applies, "There's no such thing as a free lunch."

Wm. J. Schleicher

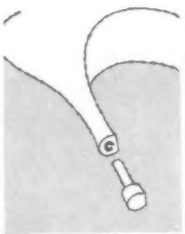
Vice President & Editorial Director

How versatile can one fastener be?

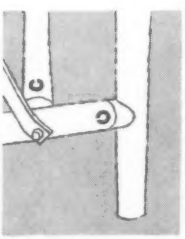
SEL-LOK spring pins can replace cotter pins, keys, axles, hinge pins, wrist pins, stop pins, pivots

FOR LAMINATING

Tool handle

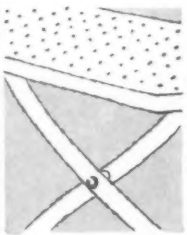


Lifts for women's shoes

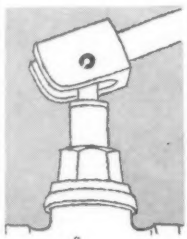


Metal table legs

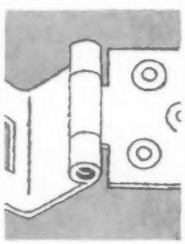
AS HINGE PIN



In leg-joint of ironing board

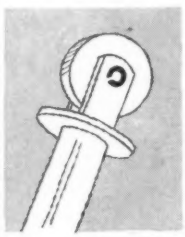


On valve handle



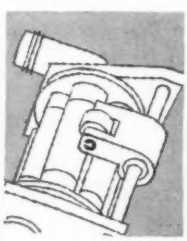
In hinge

AS AXLE



In cigarette lighter

On pulley



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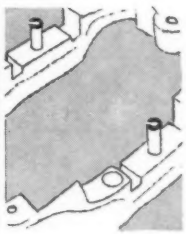

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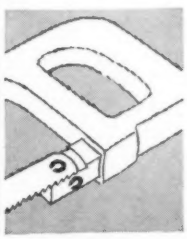

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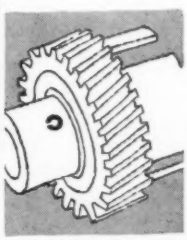
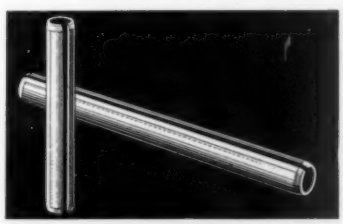


On gear in assembly

There seems to be no limit to the number of ways SEL-LOK spring pins can be used. In fact, it's difficult to keep track of the many and varied uses. SEL-LOK applications can go as far as your ingenuity will take them. SEL-LOK advantages:

- Easy to install—just drill an ordinary tolerance hole and drive the pin
- Secure locking (thanks to spring action) despite impact, shock or vibration
- Repeated reusability
- Economy—SEL-LOK eliminates costly tapping, reaming, peening and milling
- High shear strength—a SEL-LOK carbon steel pin can take the place of a solid cold-rolled pin of equal diameter

SEL-LOK spring pins are available in carbon and corrosion-resistant steel in sizes 1/16 x 3/16 through 1/2 x 5 in.; also (for superior electrical properties) in beryllium copper, sizes 1/16 x 3/16 through 1/4 x 3 1/2 in. See your SEL-LOK distributor for details or write for Bulletin 2331.



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